A brief analysis has been performed to gain a better understanding of how the marsh could be affected by the predicted water level increases as stated previously. Two main issues are of concern with the water level increase. First is the frequency of marsh inundation within a given period, and the second is related to the length of time the marsh remains inundated. As can be seen by Figure 51, there are two points that are in close proximity to the project target areas, namely points 9 and 12. The assumption is made that although these two points fall within water bodies, water levels experienced at these two locations can be projected into the nearby marsh. The marshes nearby points 9 and 12 are at an average elevation of 1.5 feet NAVD 88.

Table 3 shown below is the results of the marsh inundation analysis for each of the two proposed alternate alignments to bring freshwater into the project target areas. The analysis utilizes the data that was used to produce Figures A-53 and A-65 (located in the Appendix). The time period for each figure is from January 1, 2003 to April 3, 2003. During this period, the number of inundation events, the average duration of these events, and the longest inundation event are reported in Table 3. An inundation event is counted when the water level exceeds marsh elevation, while the duration is computed as the time elapsed from the time the water rises above marsh elevation until it falls below it. The average inundation is calculated as the simple mean of all inundation events experienced in each month. Table 3 also documents the longest inundation duration for each month. It should be emphasized that a complete and valid hydro-period analysis requires long-term records. Such records were not available at the time of writing this report. The analysis shown in Table 3 is a simplified hydro-period analaysis for only the months used in this current modeling effort, therefore care should be taken while drawing conclusions from this partial analysis. The ecological impact of this hydro analysis is outside the scope of this study and will be determined by LDNR personnel

The overall volume of freshwater conveyed to the target area is not large. Since this volume is spread over almost the entire target area (approximately 4,913 acres), the resulting increase in water level is expected to be small. Moreover, the target area is connected to the Gulf through Hog Bayou, which is an efficient drainage channel especially during low tides. Therefore, an excessive inundation of the marsh is not expected or at least it could not be sustained for prolonged periods.

Point No. 9 (Avg. Marsh = 1.5' NAVD 88)						
MONTH	No. of Events (Water Level > Marsh Elevation)		Average Inundation Period		Longest Inundation Duration	
	Alternate No. 1	Alternate No. 2	Alternate No. 1	Alternate No. 2	Alternate No. 1	Alternate No. 2
January-03	7	5	8 hours (0.3 days)	48.7 hours (2 days)	36 hours (1.5 days)	141 hours (5.8 days)
February-03	2	4	3.7 hours (0.2 days)	13.4 hours (0.5 days)	7 hours (0.3 days)	15 hours (0.6 days)
March-03	7	1	103 hours (5.5 days)	744 hours (31 days)	424 hours (18 days)	744 hours (31 days)
April-03*	5	1	6.6 hours (0.3 days)	72 hours (3 days)	20.5 hours (0.9 days)	72 hours (3 days)
* Time Period Ends on April 3, 2003						

Point No. 12 (Avg. Marsh = 1.5' NAVD 88) (Avg. Marsh = 1.5' NAVD 88)						
MONTH	No. of Events (Water Level > Marsh Elevation)		Average Inundation Period		Longest Inundation Duration	
	Alternate No. 1	Alternate No. 2	Alternate No. 1	Alternate No. 2	Alternate No. 1	Alternate No. 2
January-03	12	10	6.5 hours (0.3 days)	5.35 hours (0.2 days)	10.5 hours (0.4 days)	11.5 days (0.5 days)
February-03	2	9	1.75 hours (0.08 days)	5.4 hours (0.2 days)	2.5 hours (0.1 days)	24 hours (1 day)
March-03	4	1	186 hours (7.8 days)	744 hours (31 days)	735 hours (30.6 days)	744 hours (31 days)
April-03*	3	3	13.5 hours (0.6 days)	12.2 hours (0.5 days)	17.5 hours (0.7 days)	15.5 hours (0.6 days)
* Time Period Ends on April 3, 2003						

Table 3: Marsh Inundation Analysis

Although the decrease in salinity is favorable for the marsh environment, the increase in water level that was observed could have some adverse effects. It is our recommendation to perform an ecological and a biological study for the marshes to examine how the marsh environment will respond to the new change along both the short and the long times period.

Since both alignments yielded roughly the same hydrodynamic and salinity results, other logistical considerations (land rights, construction cost, time to construct, etc.) should be considered when selecting the final alignment to be implemented in the field.

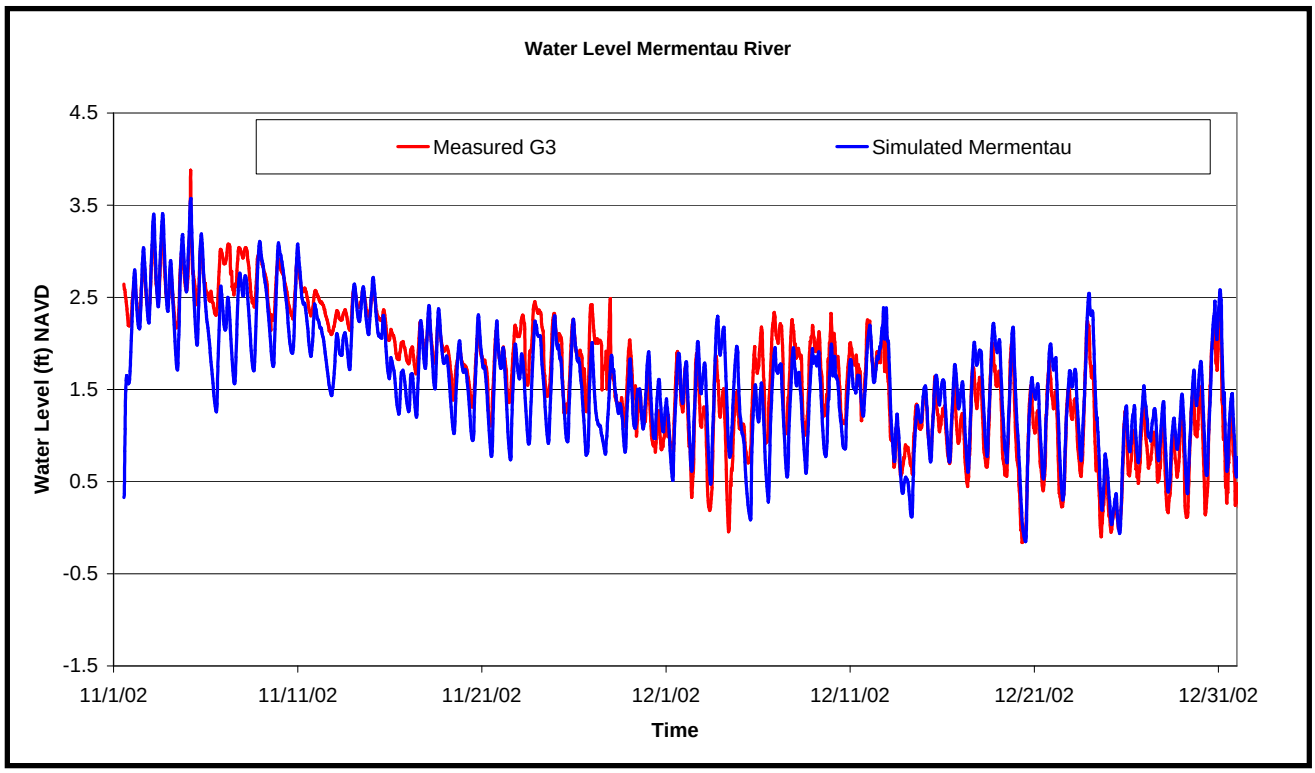


Figure A-1: Water Level Model Results Compared To Field Data At G3 Mermentau River (Calibration)

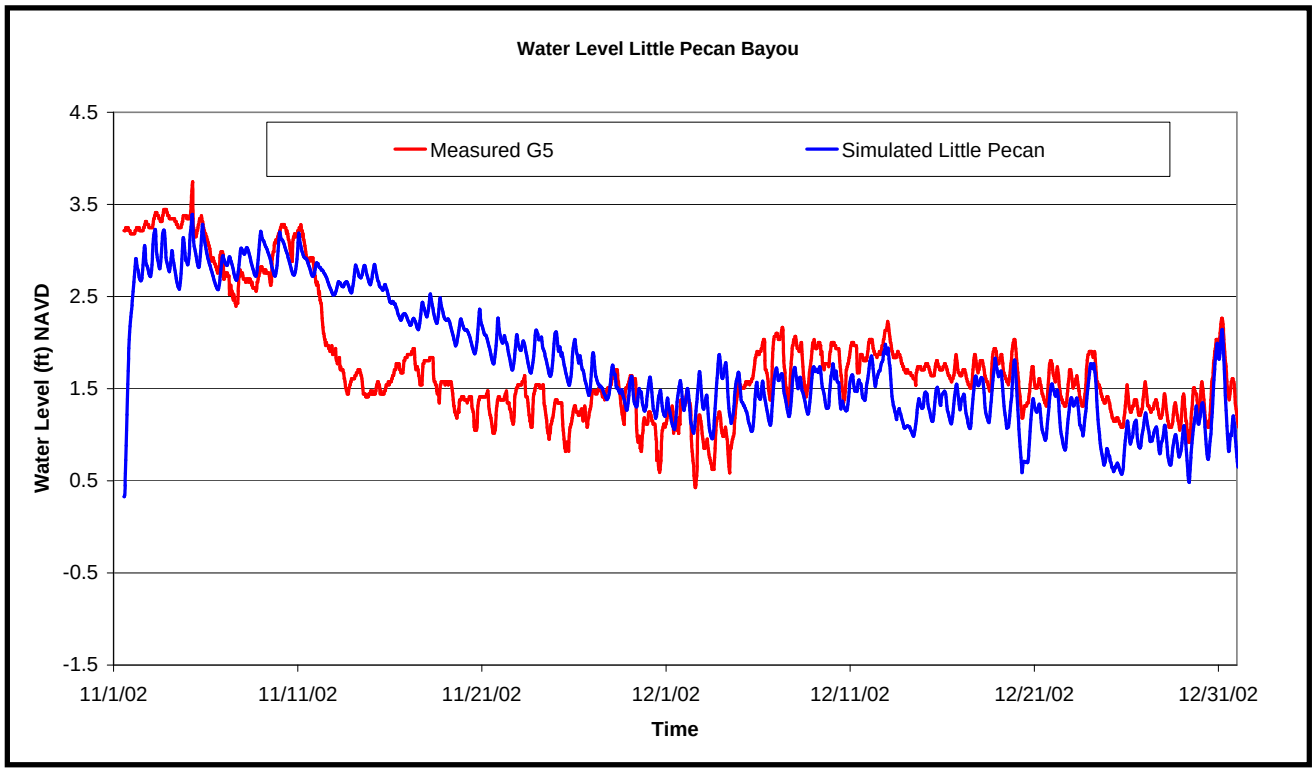


Figure A-2: Water Level Model Results Compared To Field Data At G5 Little Pecan Bayou (Calibration)

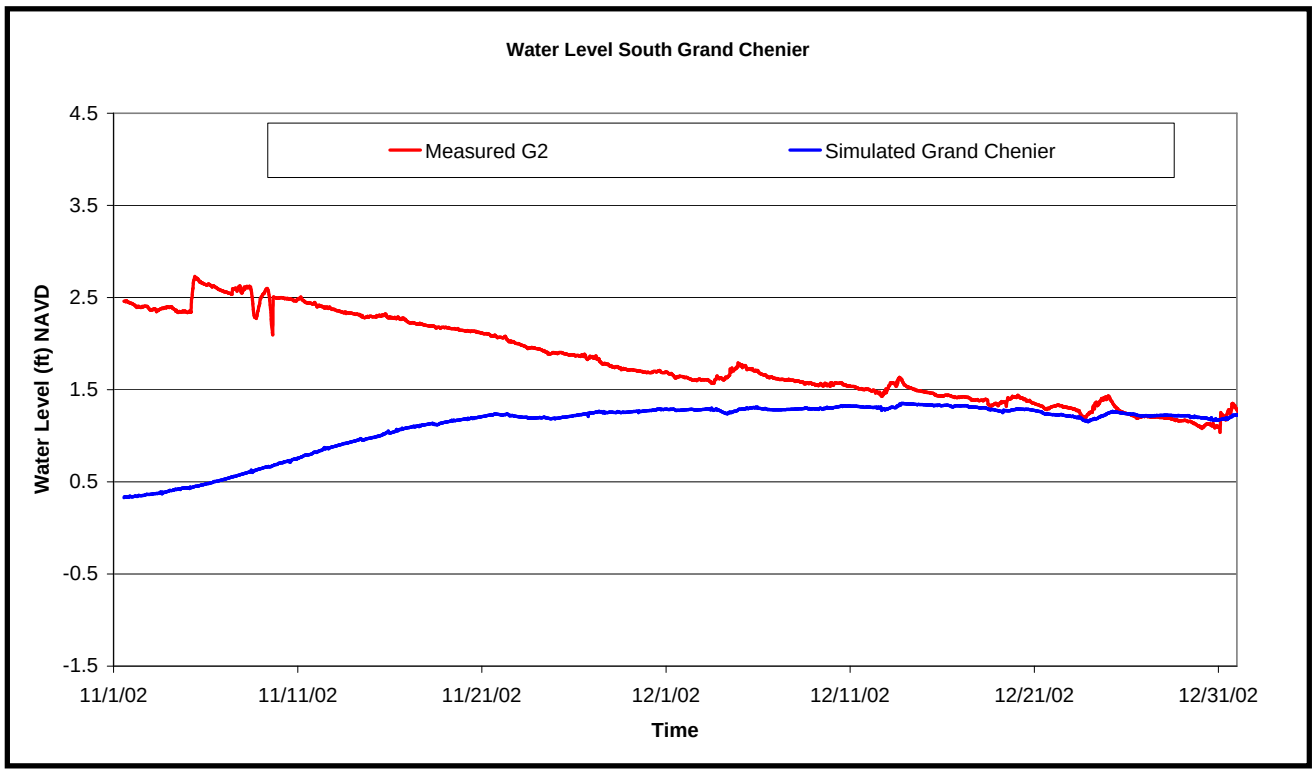


Figure A-3: Water Level Model Results Compared To Field Data At G2 Second Lake Cut (Calibration)

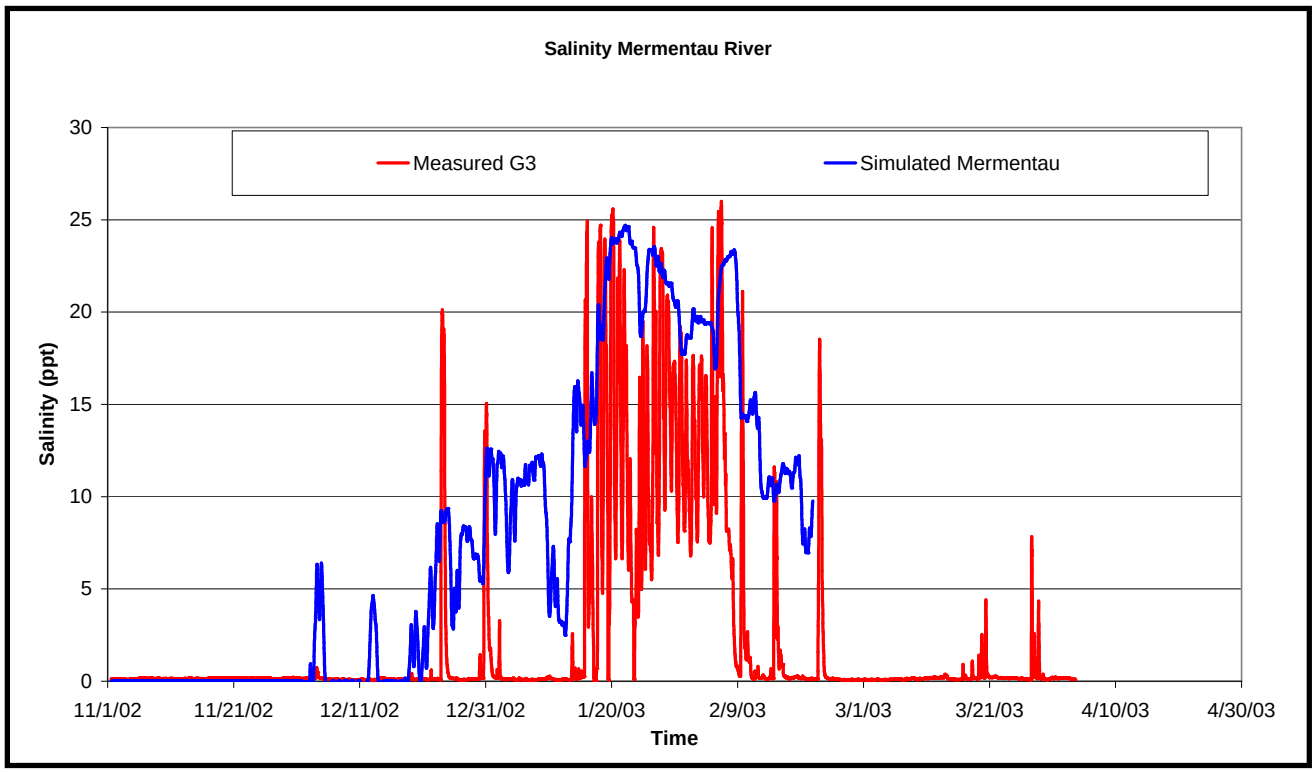


Figure A-4: Salinity Model Results Compared To Field Data At G3 Mermentau River (Calibration)

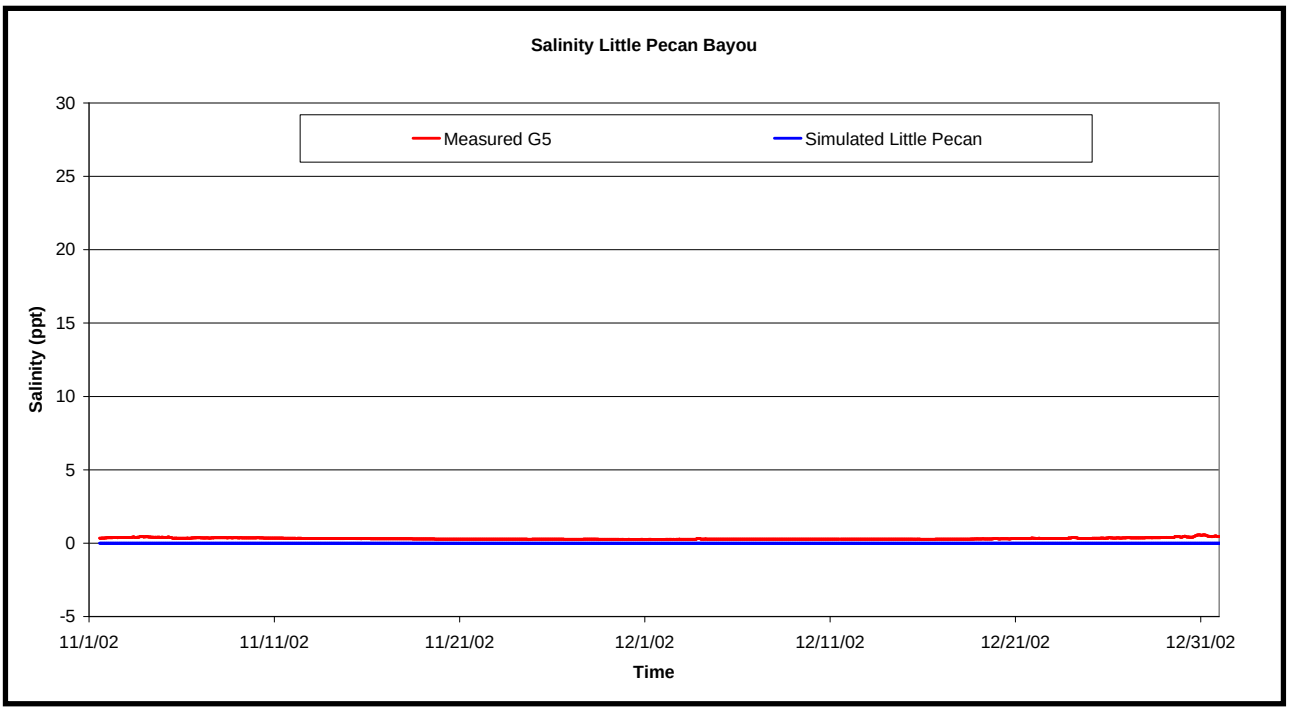


Figure A-5: Salinity Model Results Compared To Field Data At G5 Little Pecan Bayou (Calibration)

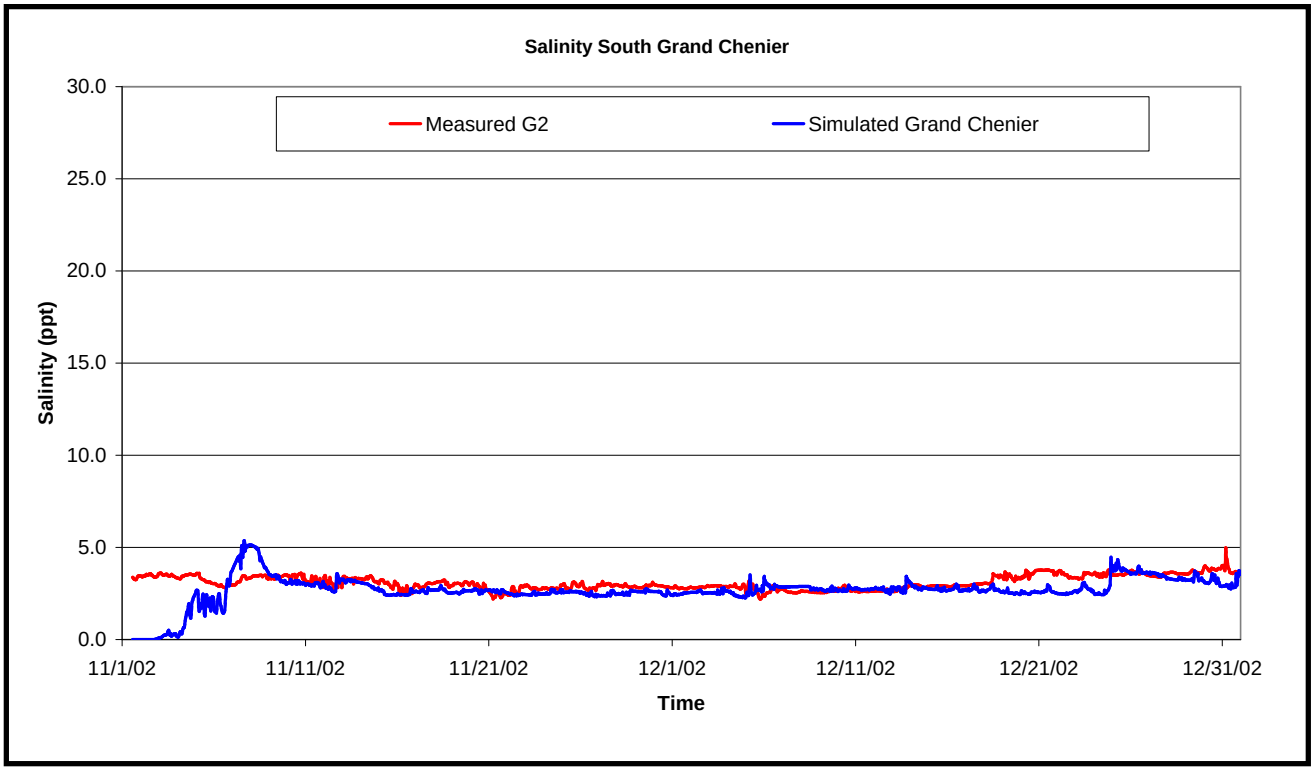


Figure A-6: Salinity Model Results Compared To Field Data At G2 Second Lake Cut (Calibration)

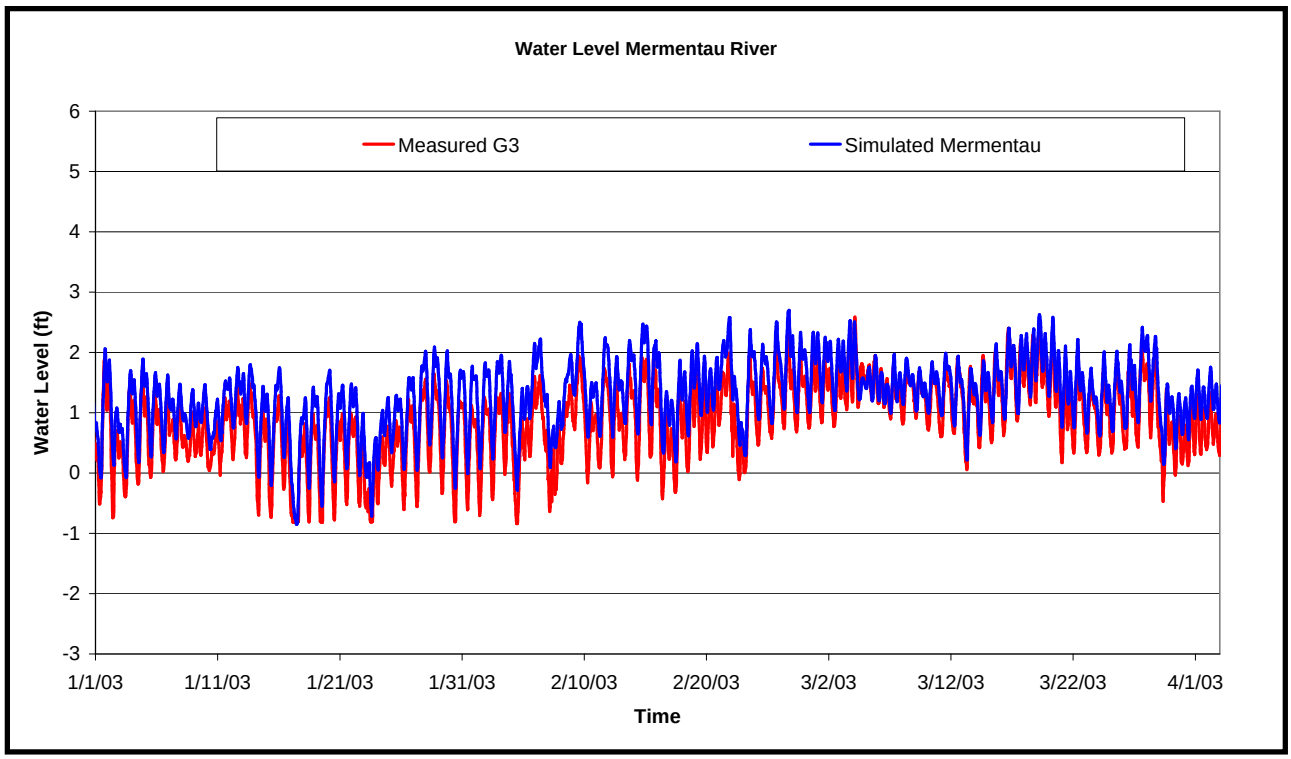


Figure A-7: Water Level Model Results Compared To Field Data At G3 Mermentau River (Validation)

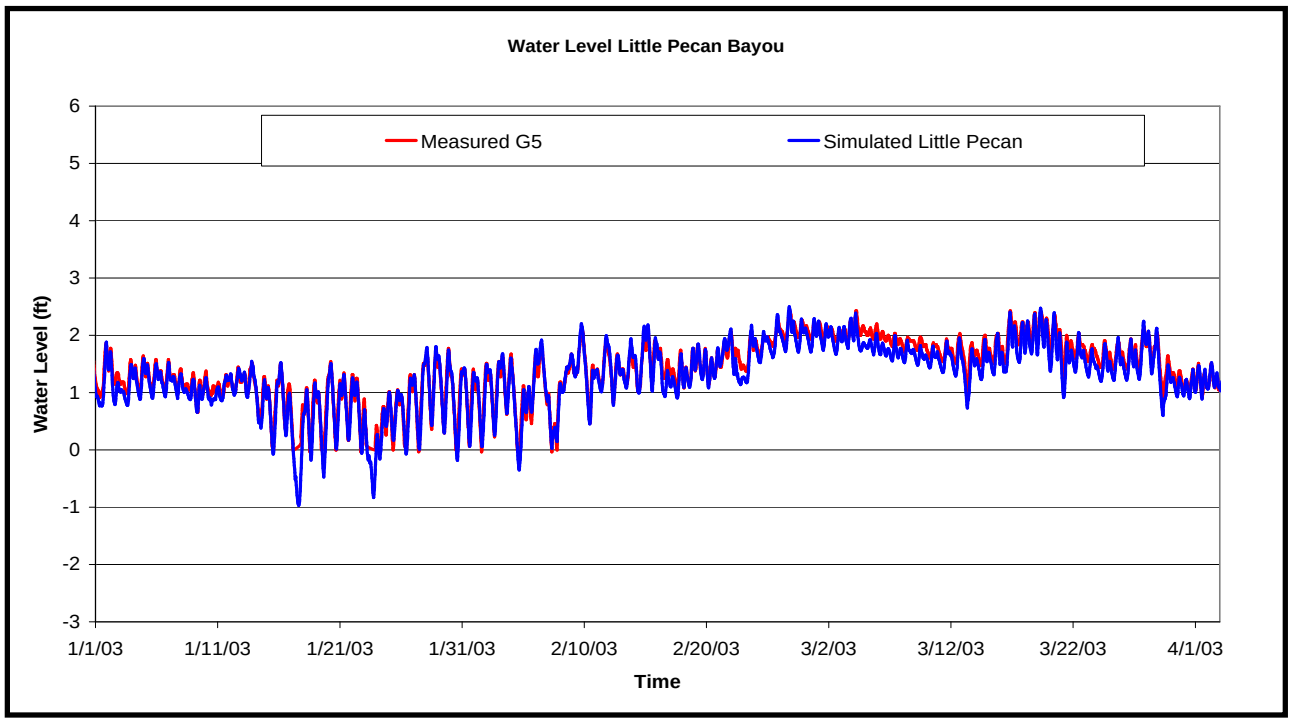


Figure A-8: Water Level Model Results Compared To Field Data At G5 Little Pecan Bayou (Validation)

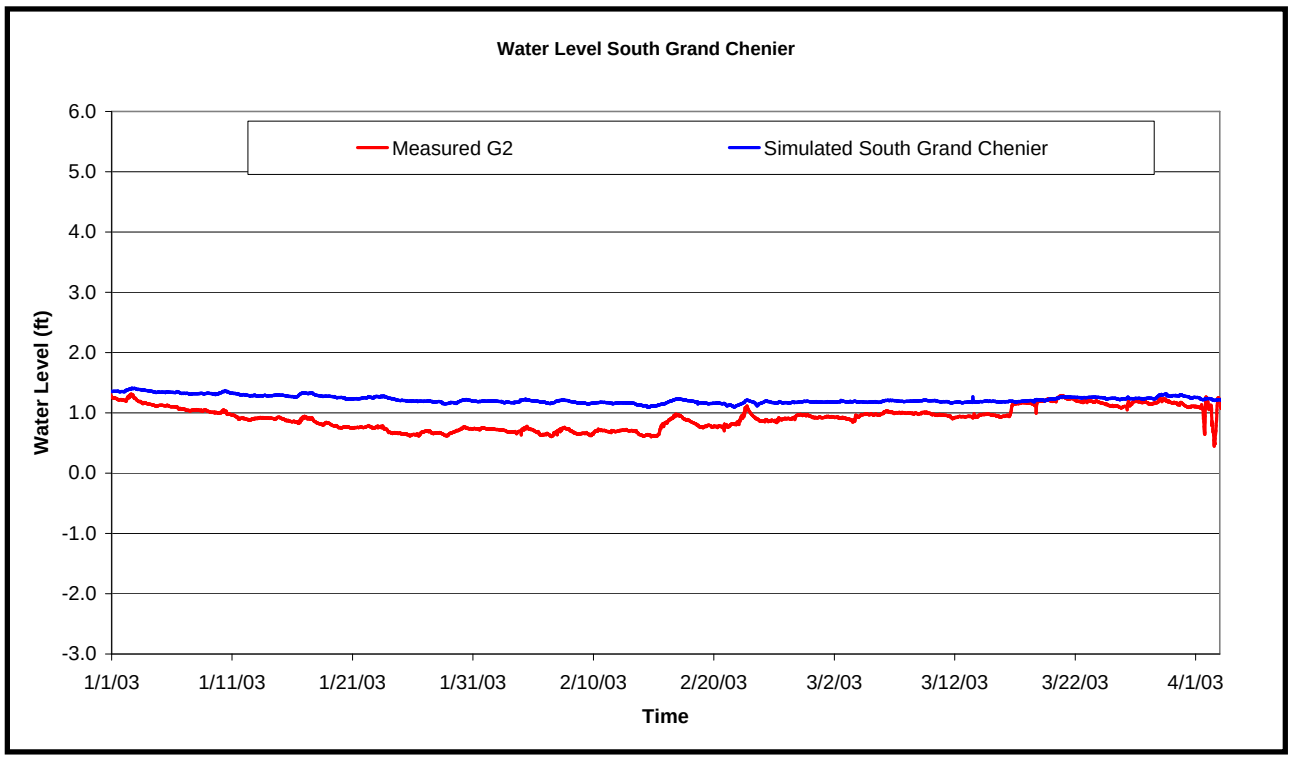


Figure A-9: Water Level Model Results Compared To Field Data At G2 Second Lake Cut (Validation)

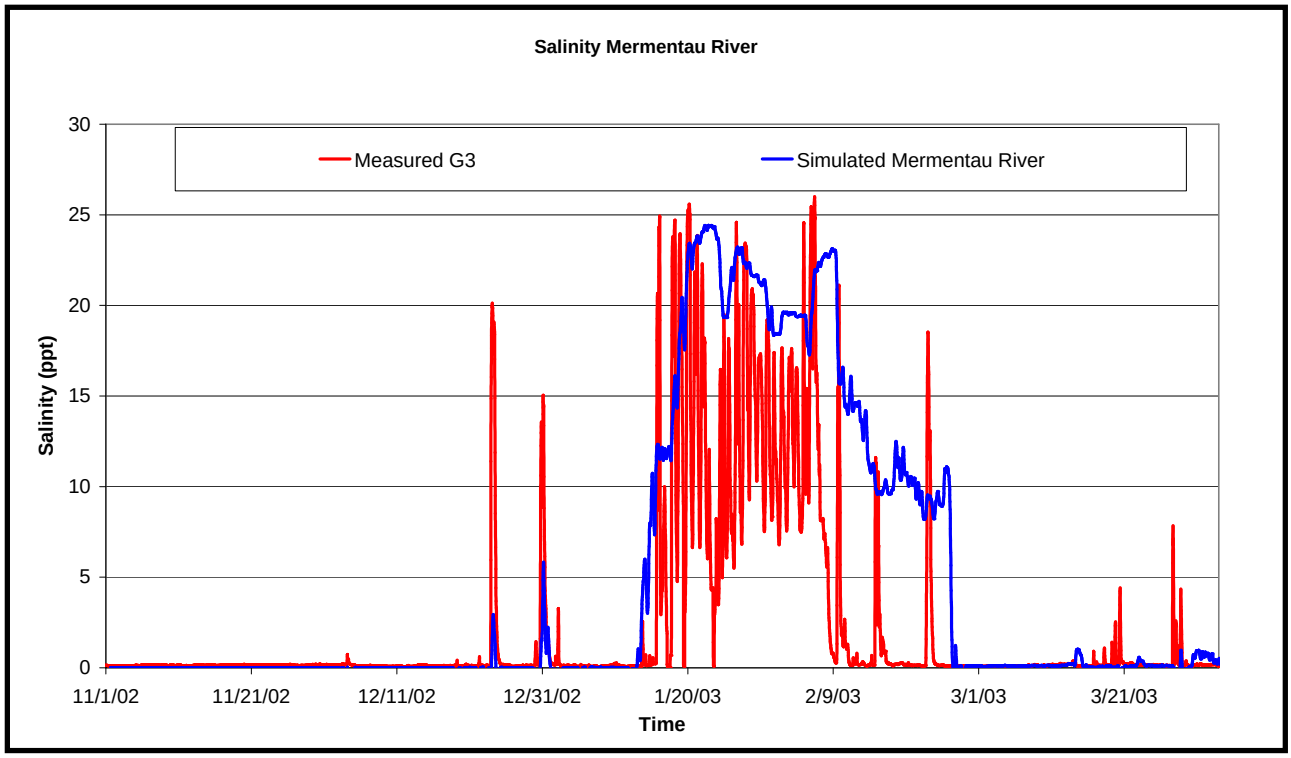


Figure A-10: Salinity Model Results Compared To Field Data At G3 Mermentau River (Validation)

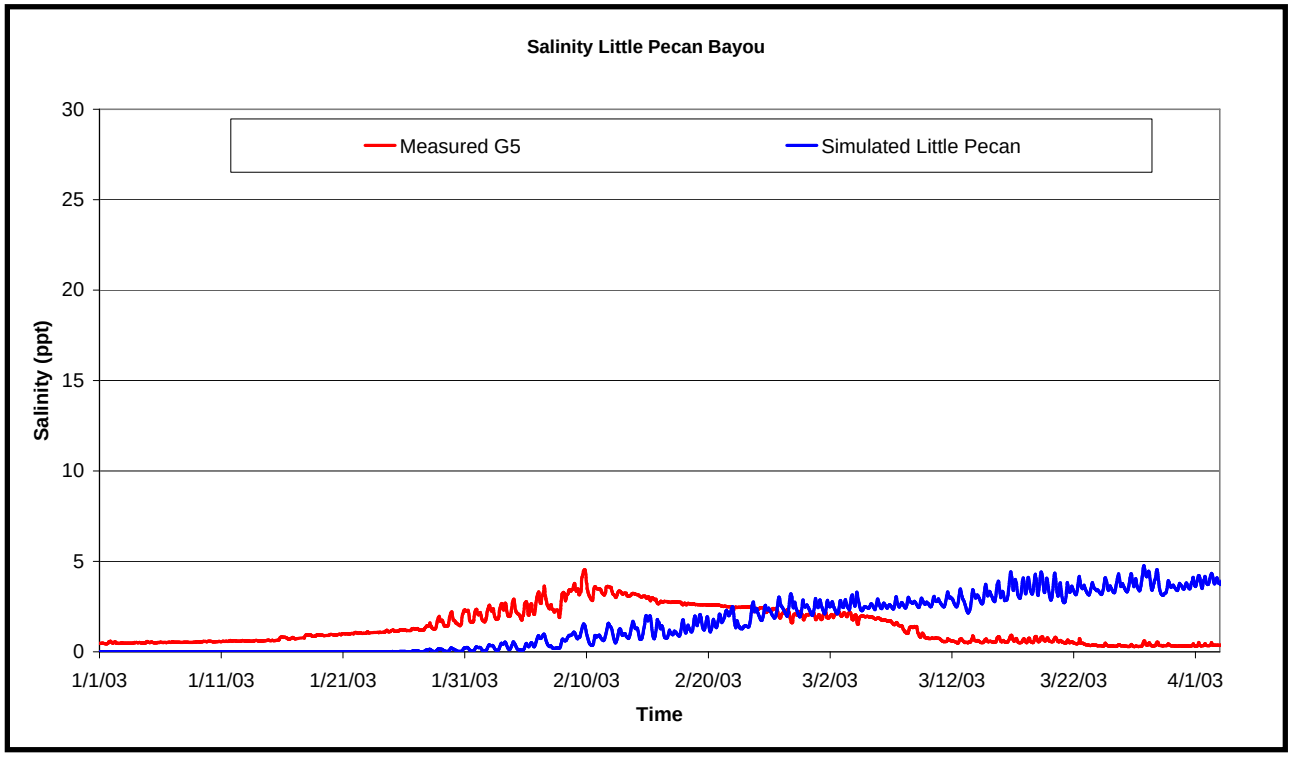


Figure A-11: Salinity Model Results Compared To Field Data At G5 Little Pecan Bayou (Validation)

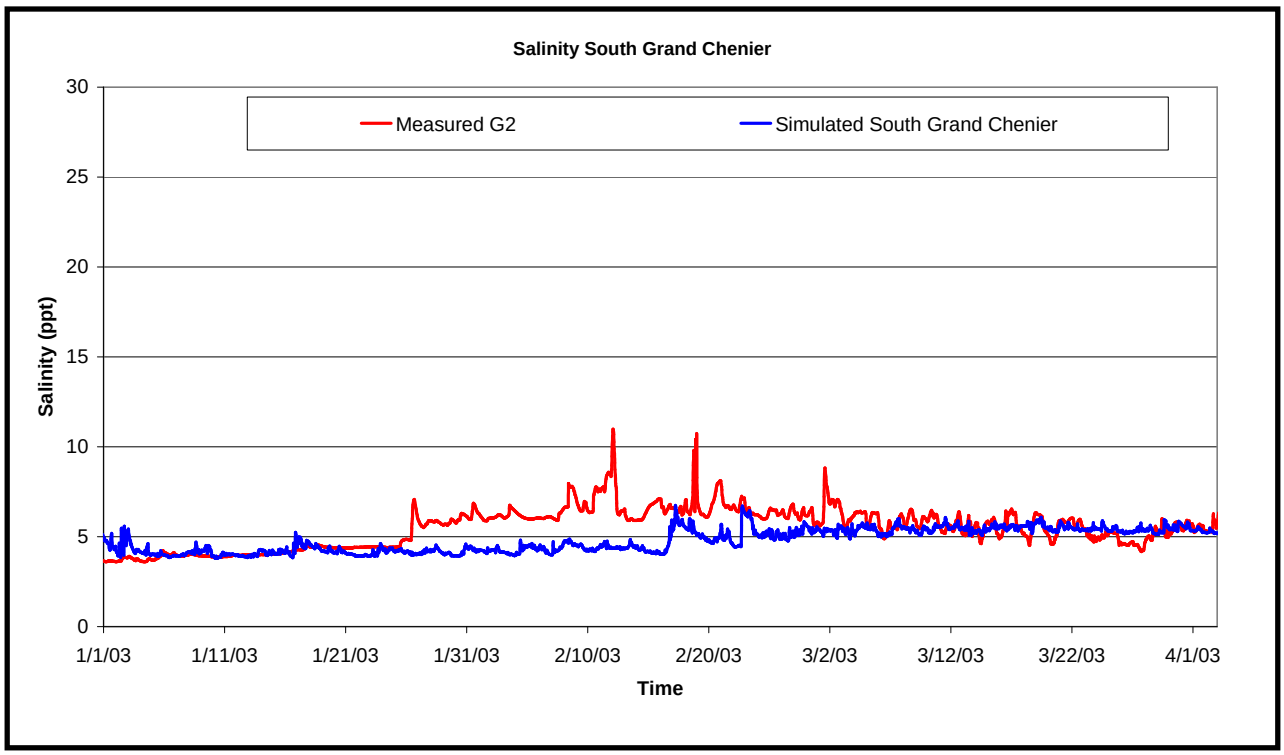


Figure A-12: Salinity Model Results Compared To Field Data At G2 Second Lake Cut (Validation)

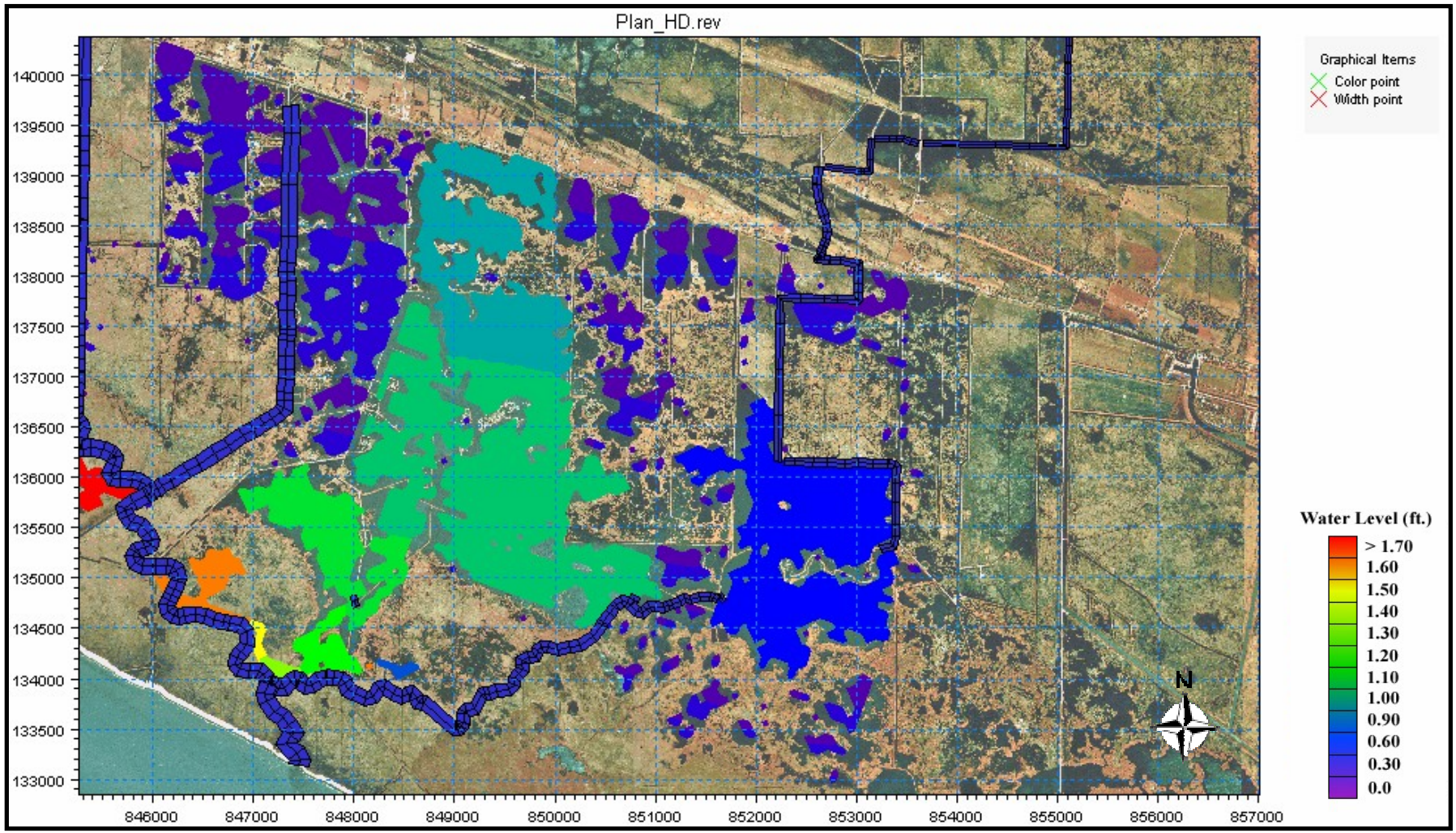


Figure A-13: Water Level Contour Map For The South Grand Chenier Area At 11/15/02 4:00 AM

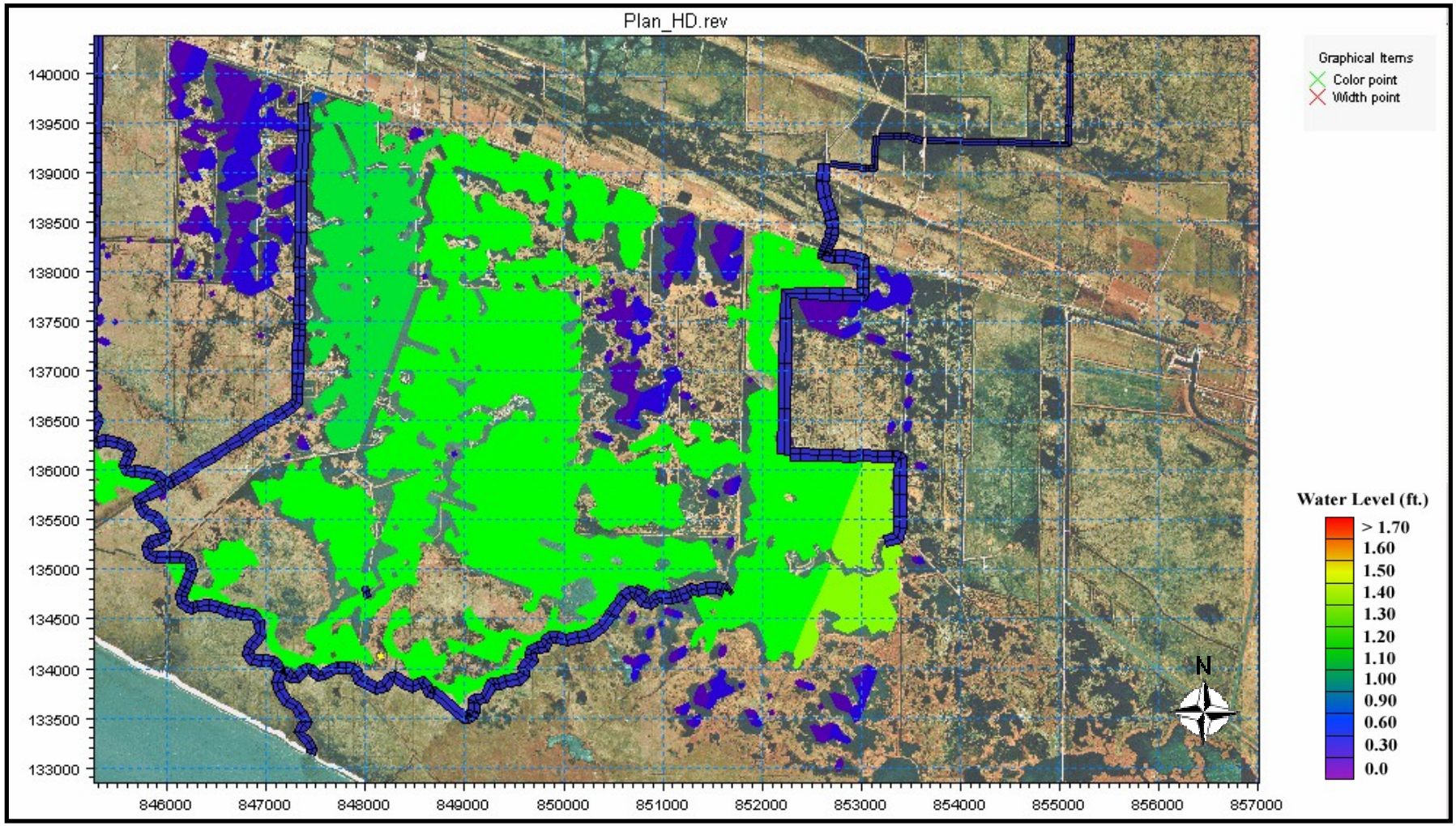


Figure A-14: Water Level Contour Map For The South Grand Chenier Area At 01/03/03 3:00 AM

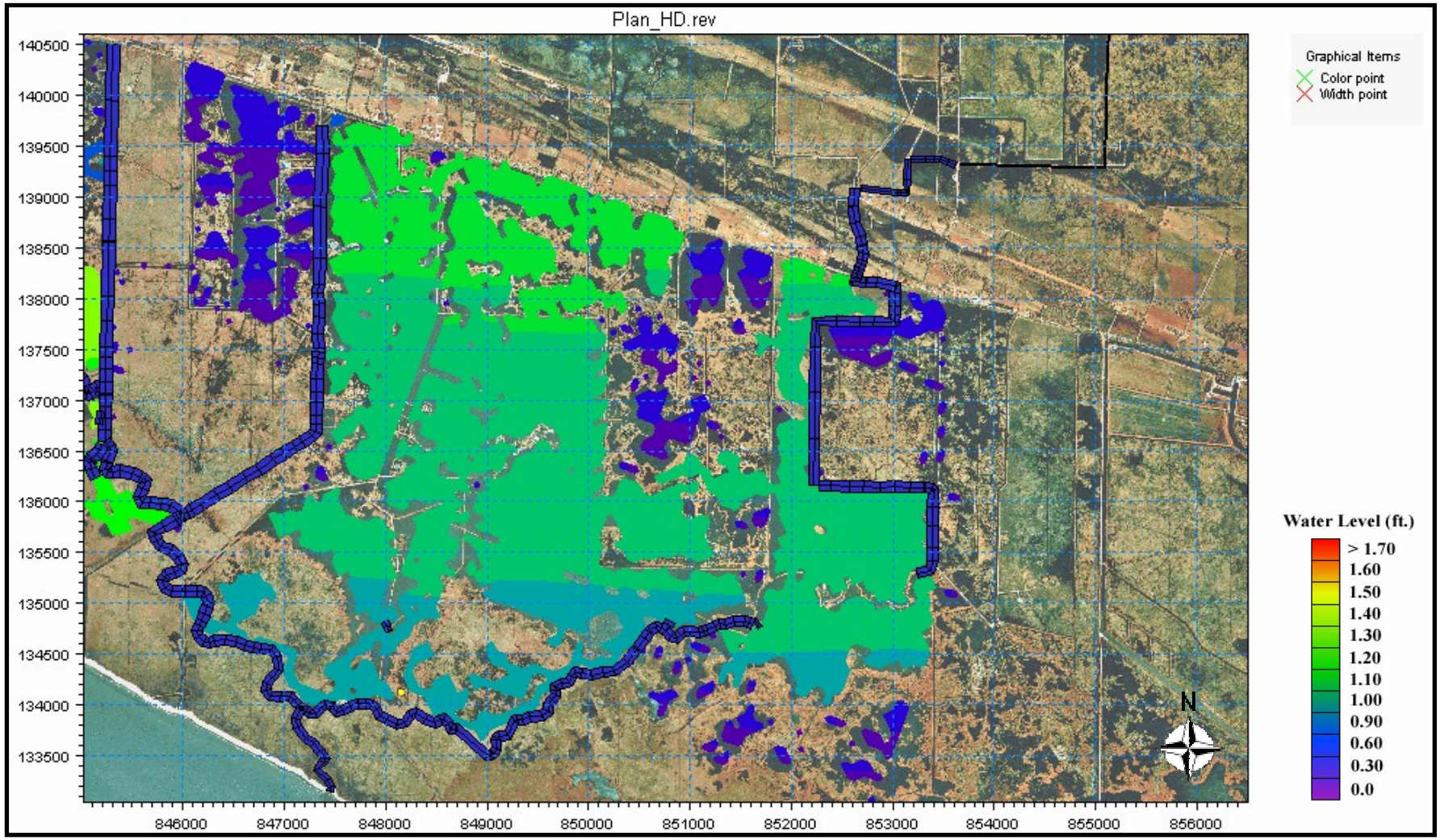


Figure A-15: Water Level Contour Map For The South Grand Chenier Area At 02/03/03 09:00 AM

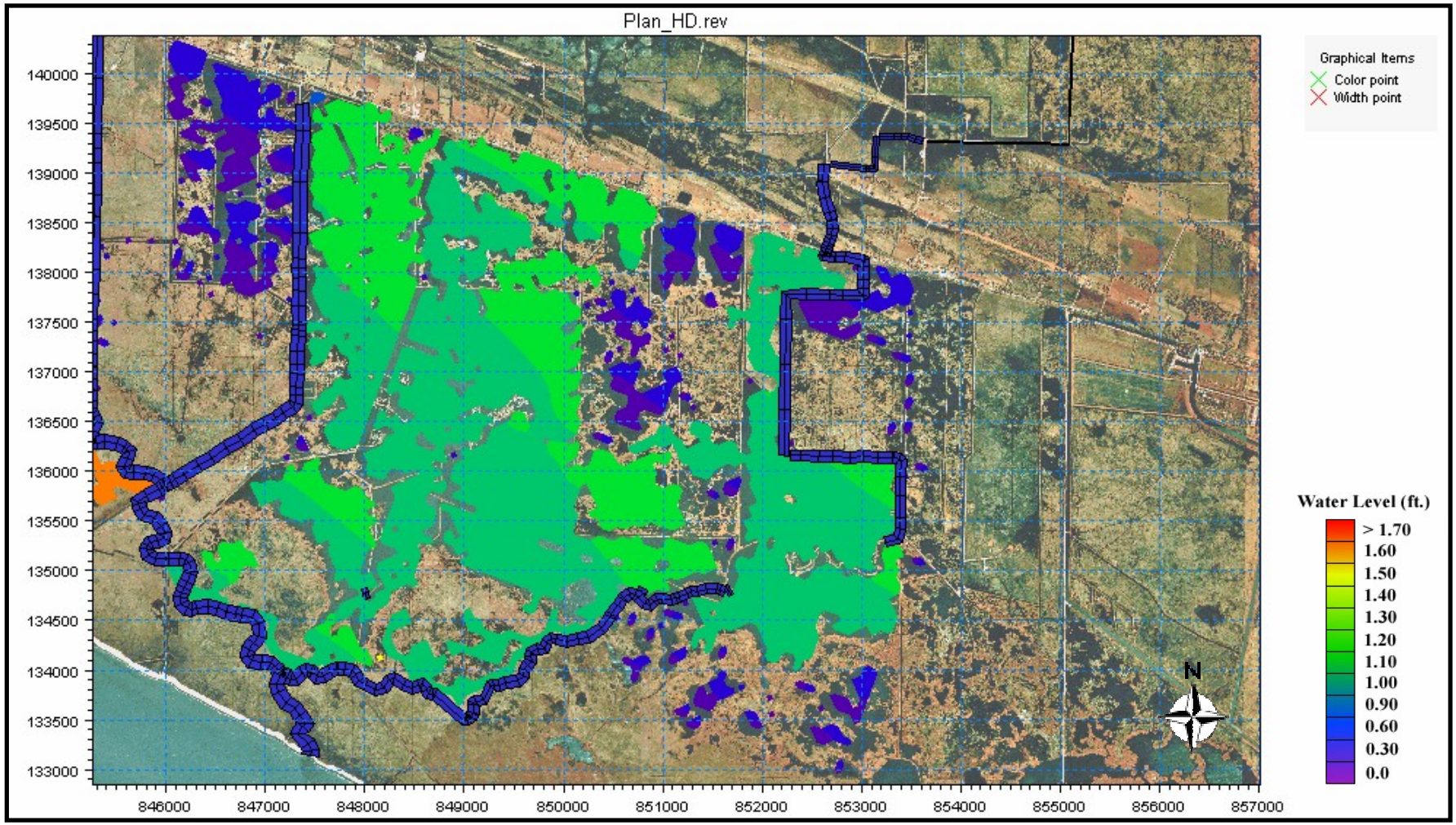


Figure A-16: Water Level Contour Map For The South Grand Chenier Area At 03/18/03 3:00 PM

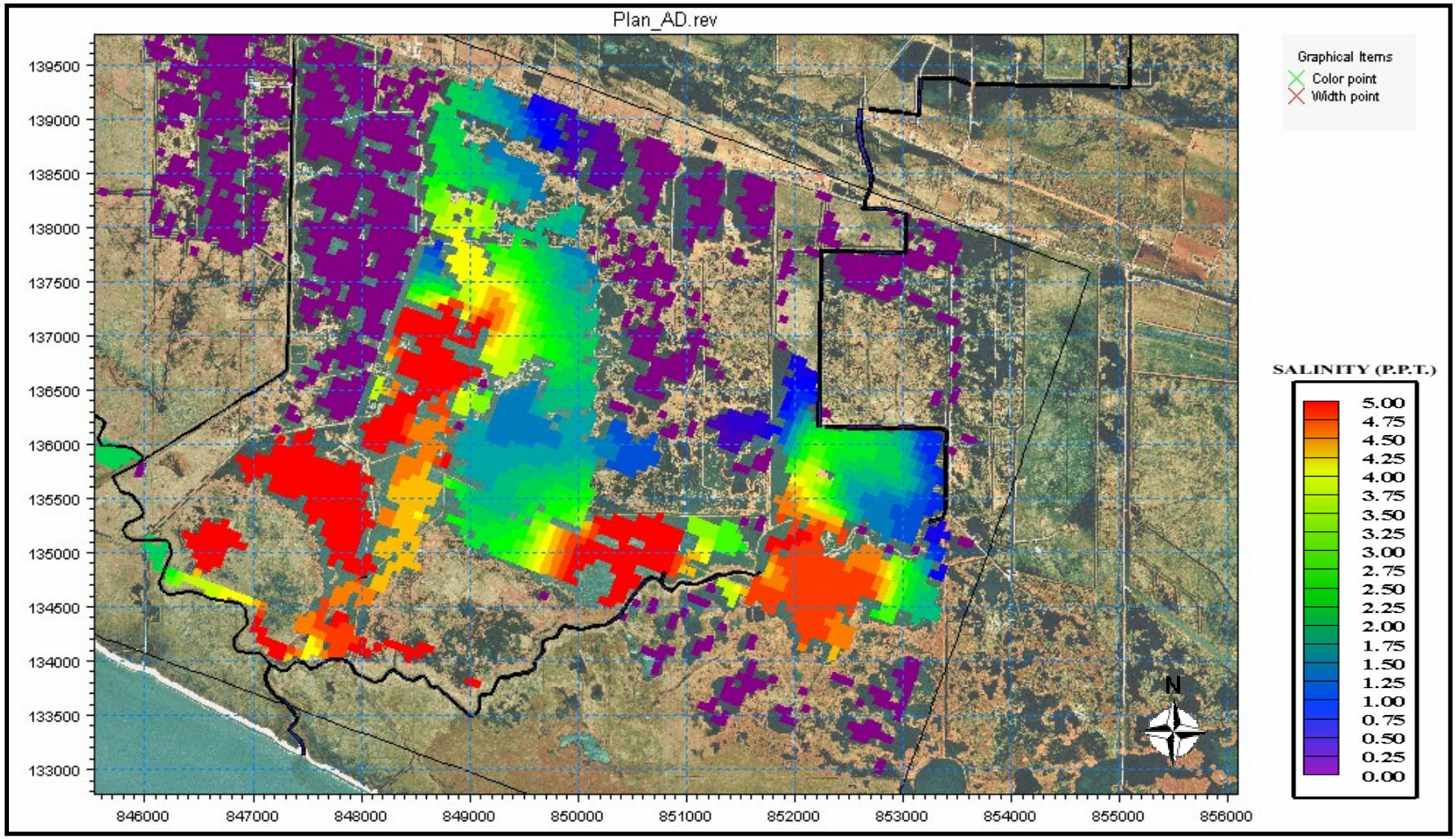


Figure A-17: Salinity Contour Map For The South Grand Chenier Area At 11/15/02 4:00 AM

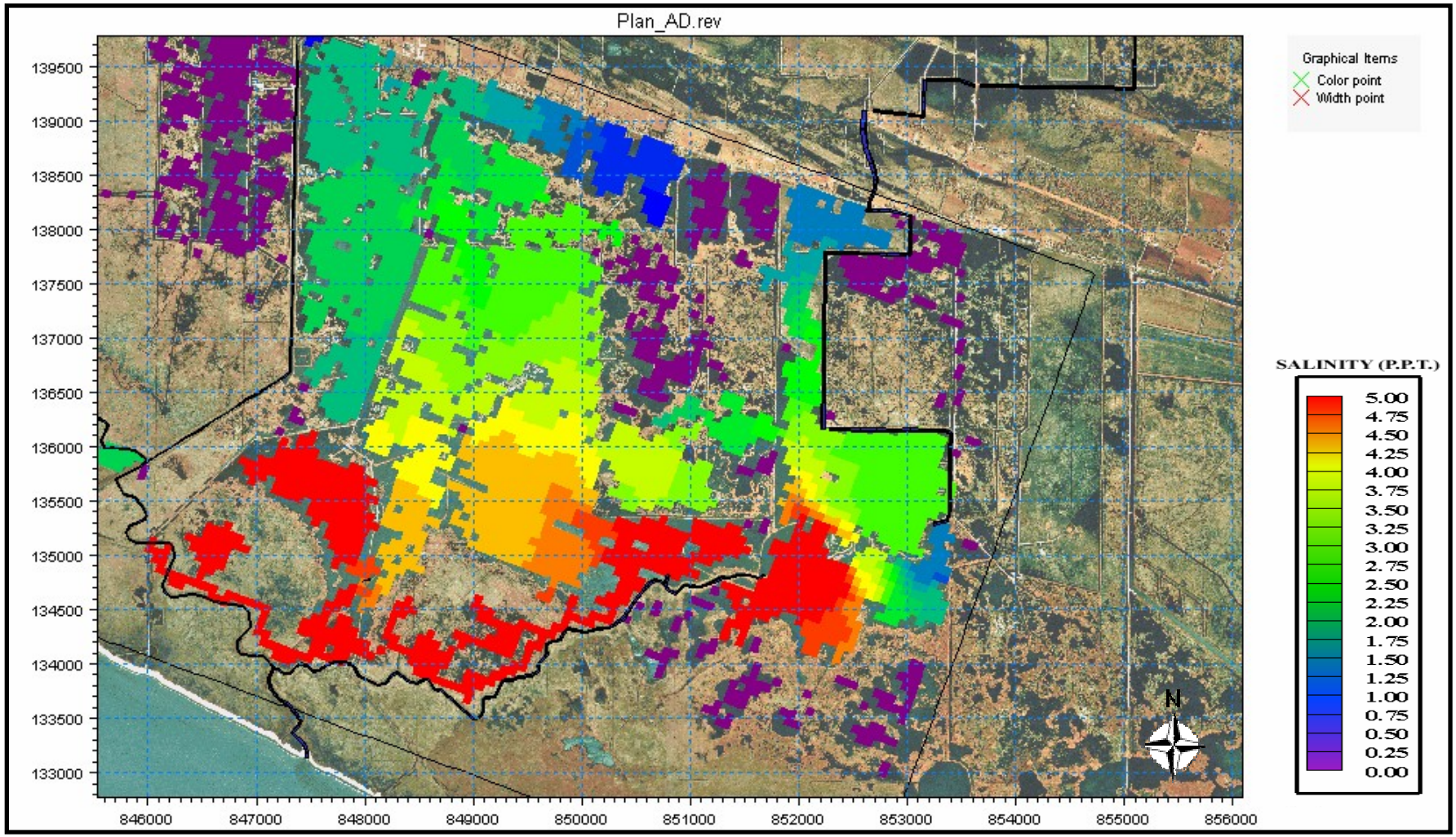


Figure A-18: Salinity Contour Map For The South Grand Chenier Area At 01/03/03 3:00 AM

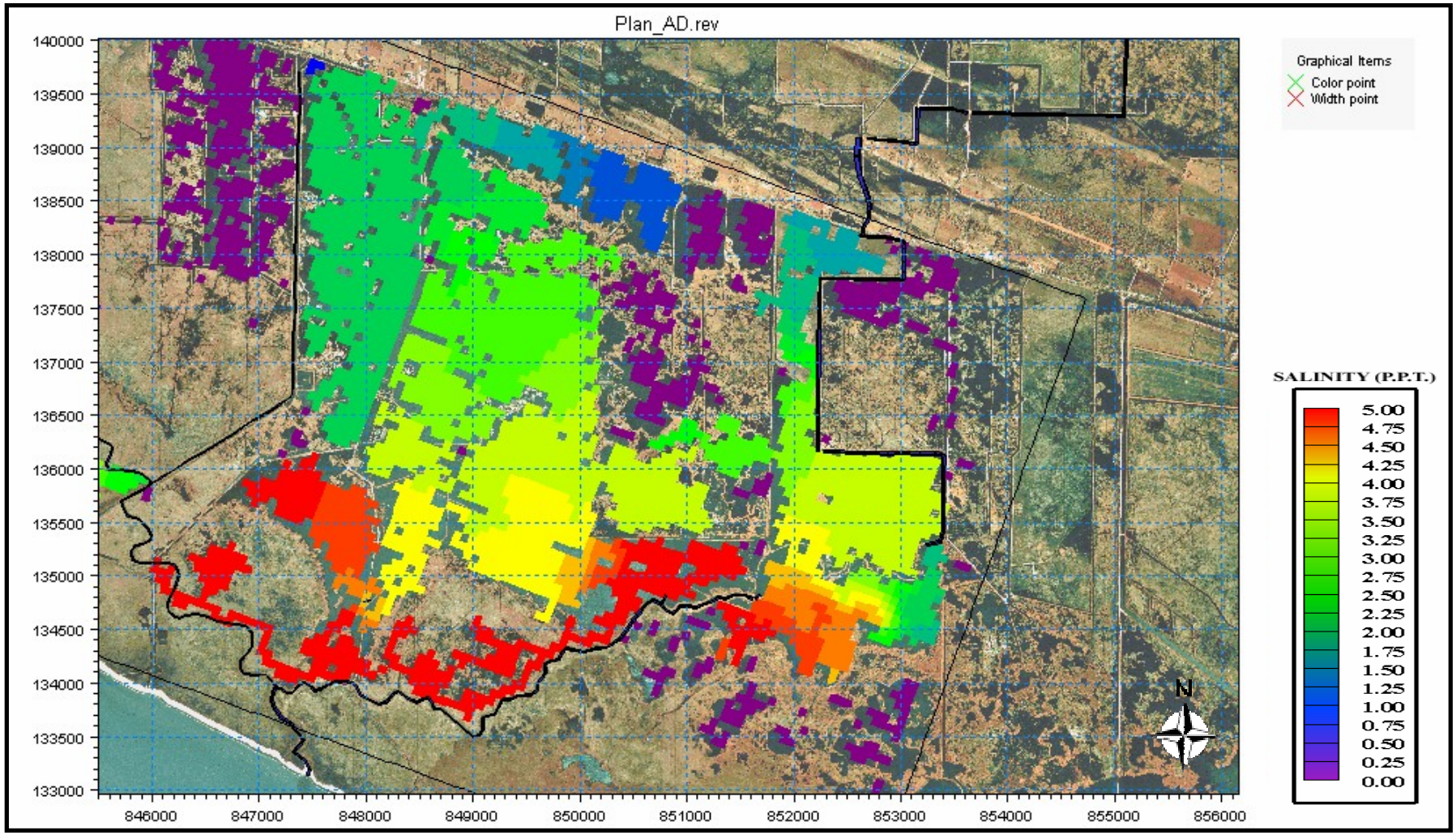


Figure A-19: Salinity Contour Map For The South Grand Chenier Area At 02/03/03 3:00 AM

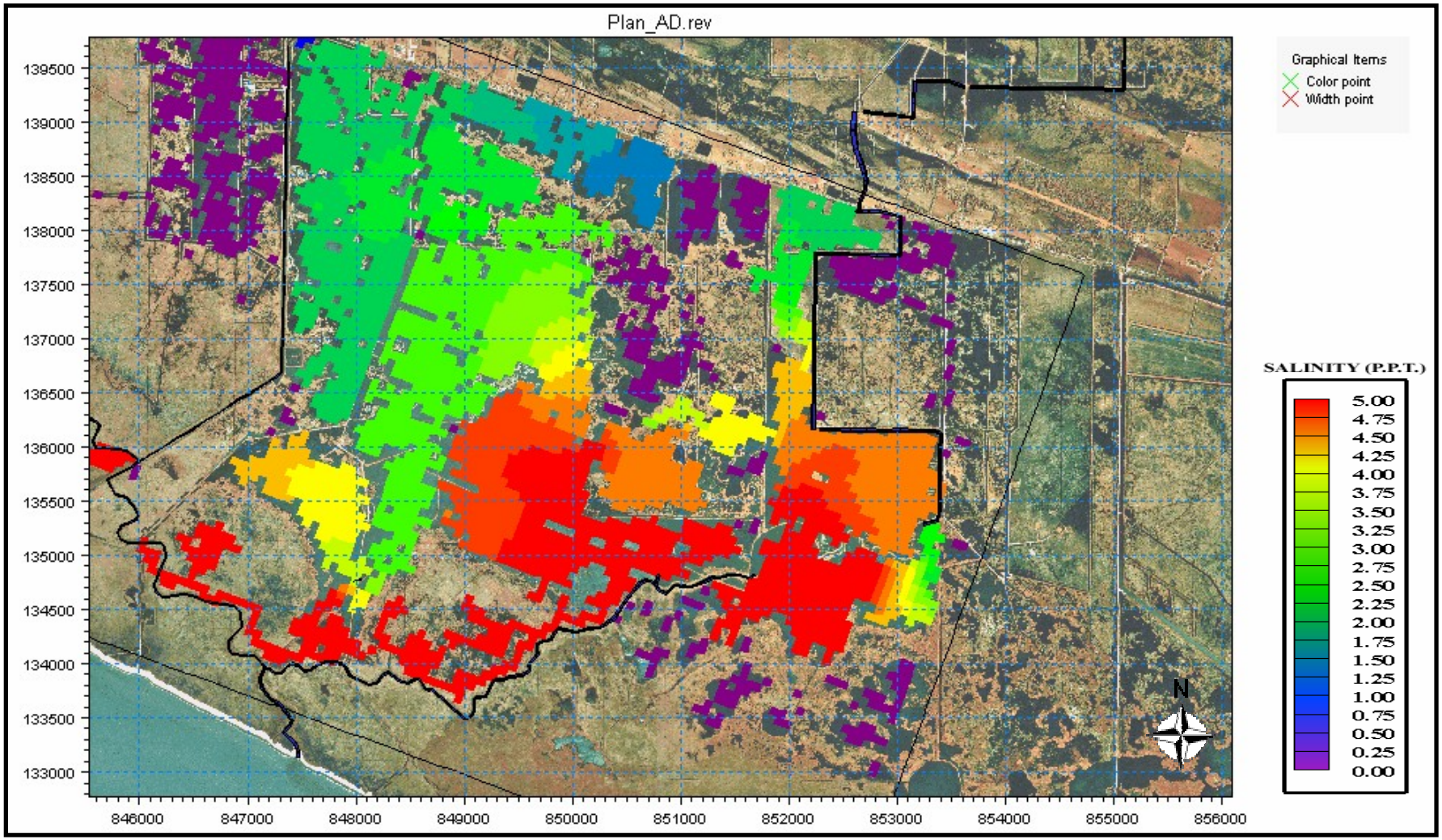


Figure A-20: Salinity Contour Map For The South Grand Chenier Area At 03/18/03 3:00 PM

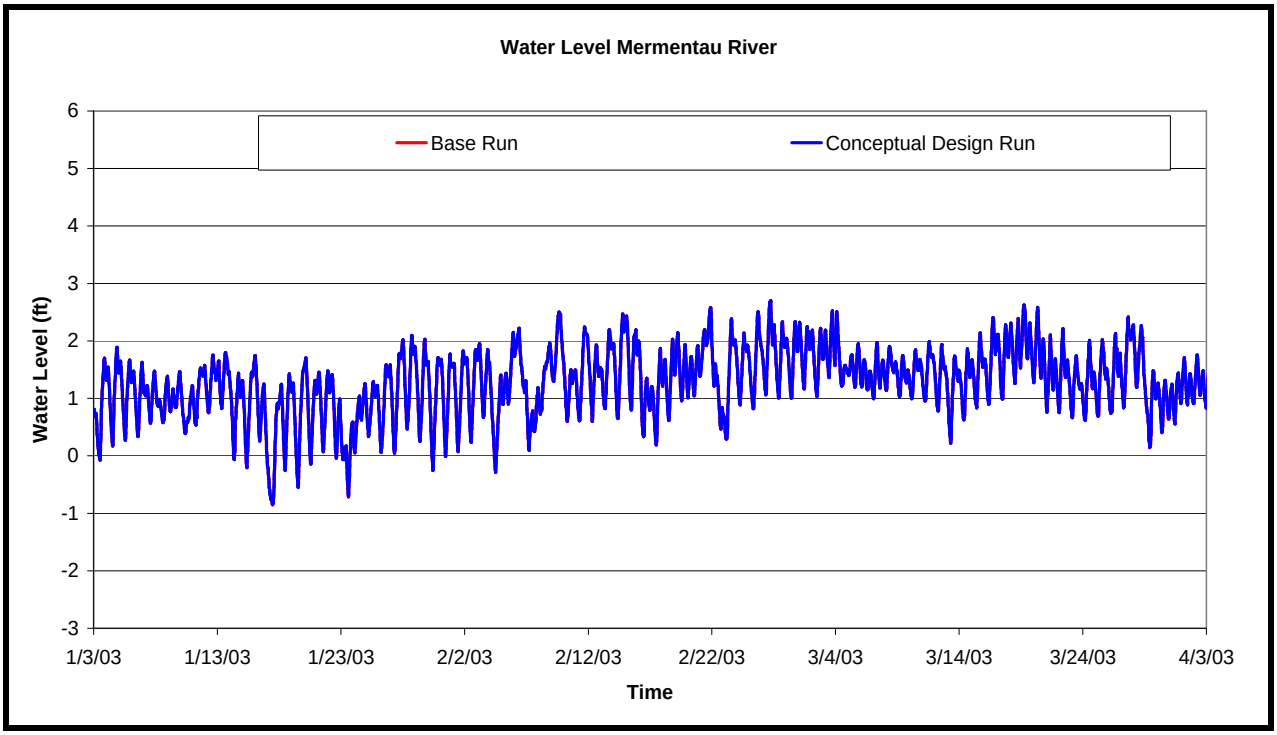


Figure A-21: Water Level Base Run Results Vs. Conceptual Design Run At The Mermentau River.

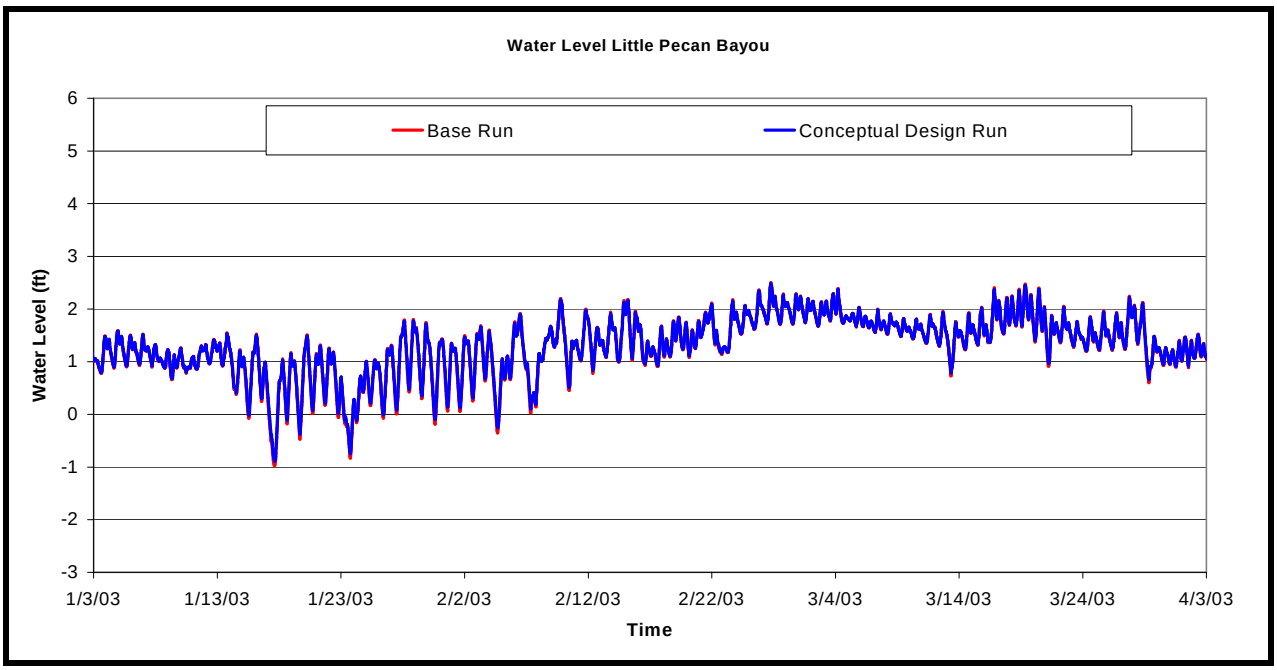


Figure A-22: Water Level Base Run Results Vs. Conceptual Design Run At Little Pecan Bayou.

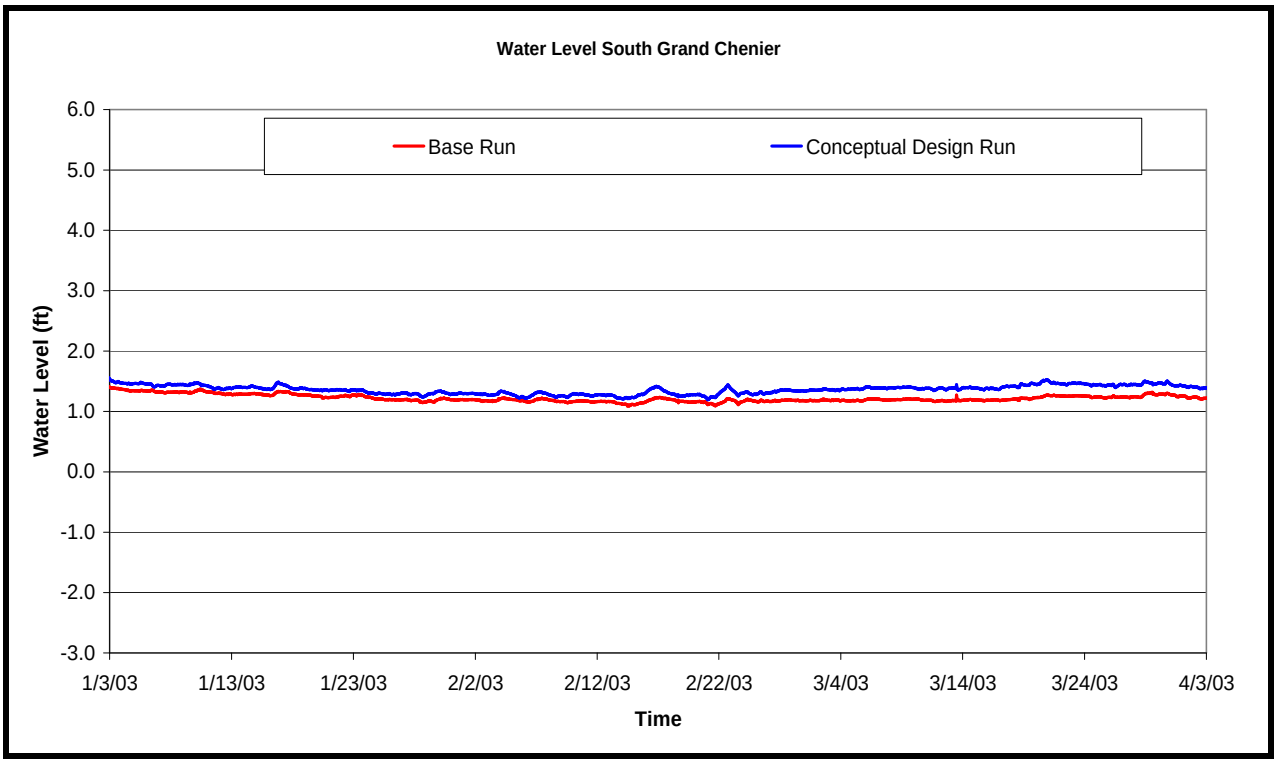


Figure A-23: Water Level Base Run Results Vs. Conceptual Design Run At Grand Chenier (Second Lake).

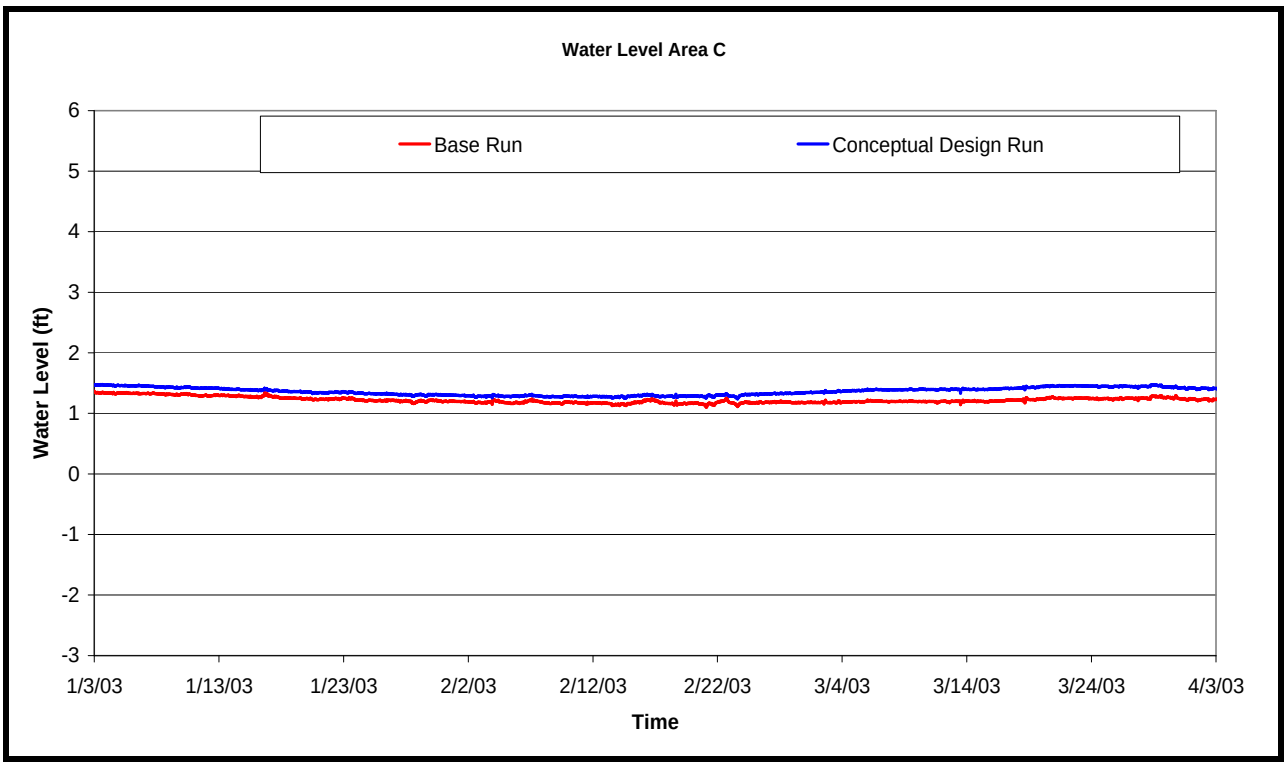


Figure A-24: Water Level Base Run Results Vs. Conceptual Design Run At Area C (Grand Chenier).

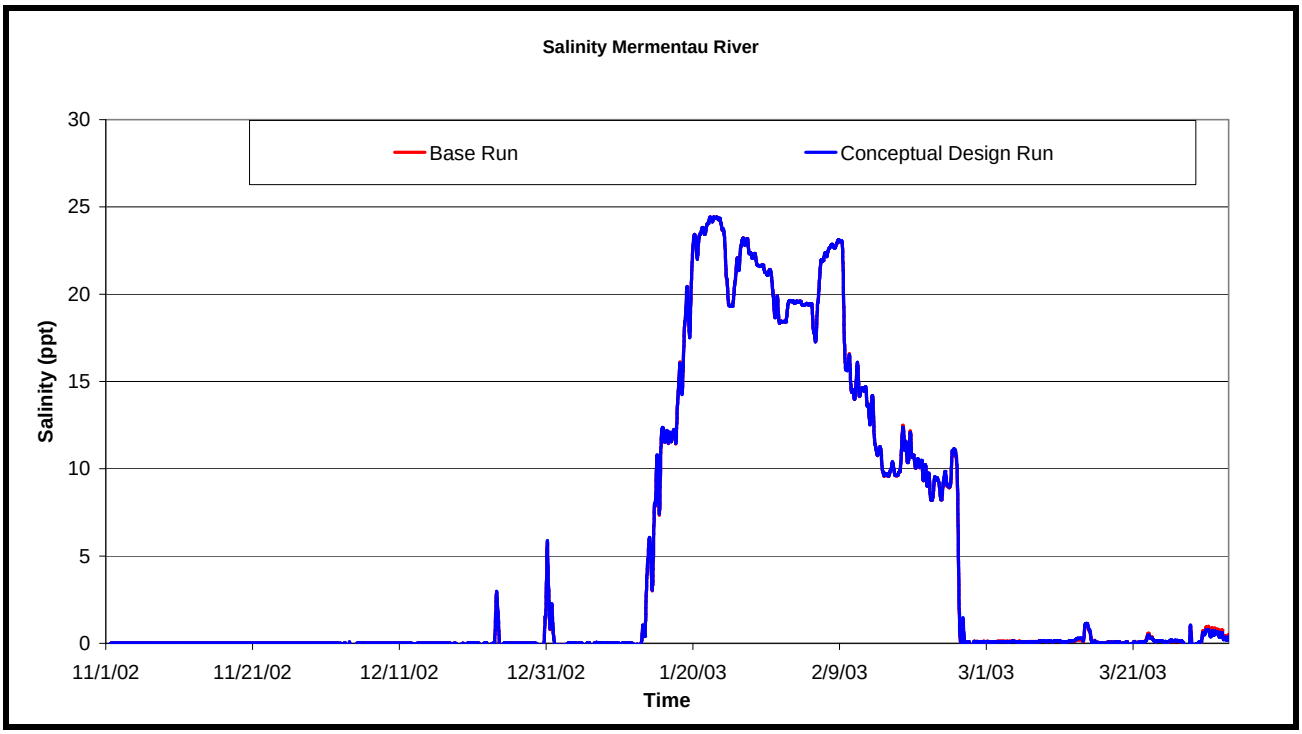


Figure A-25: Salinity Base Run Results Vs. Conceptual Design Run At The Mermentau River.

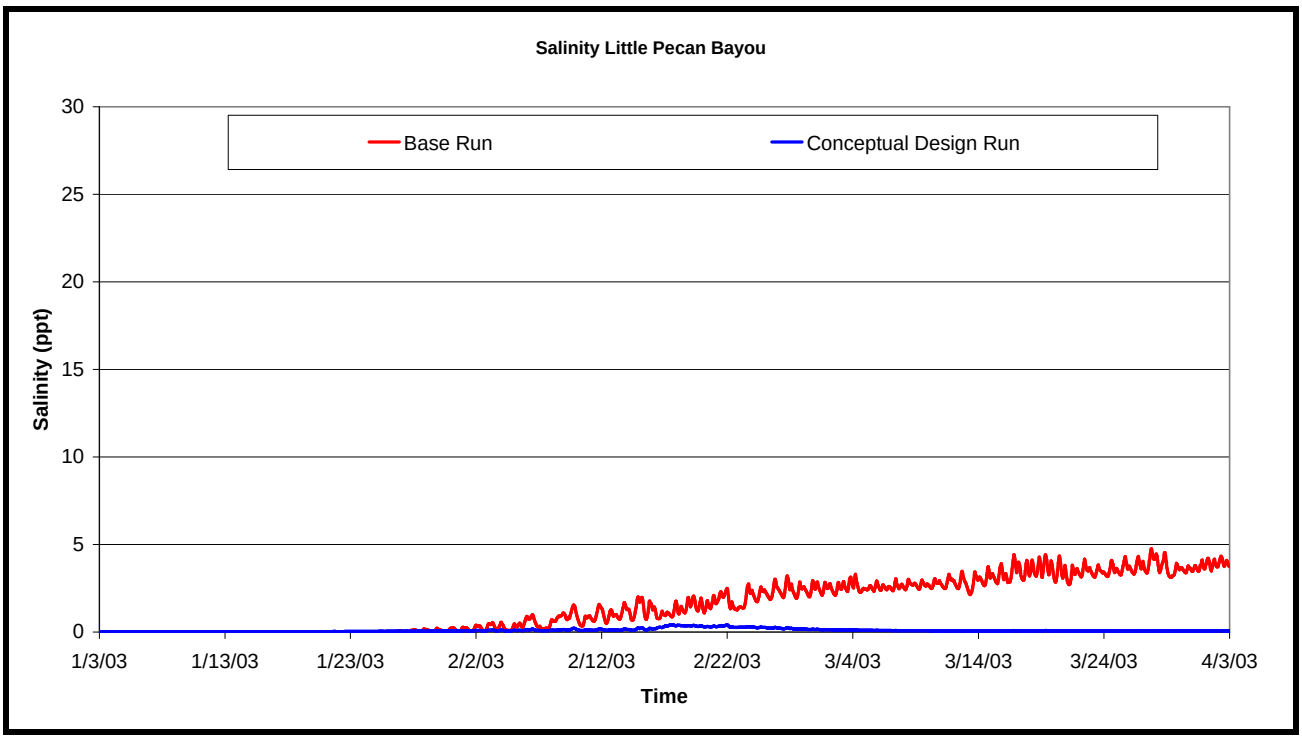


Figure A-26: Salinity Base Run Results Vs. Conceptual Design Run At The Little Pecan Bayou.

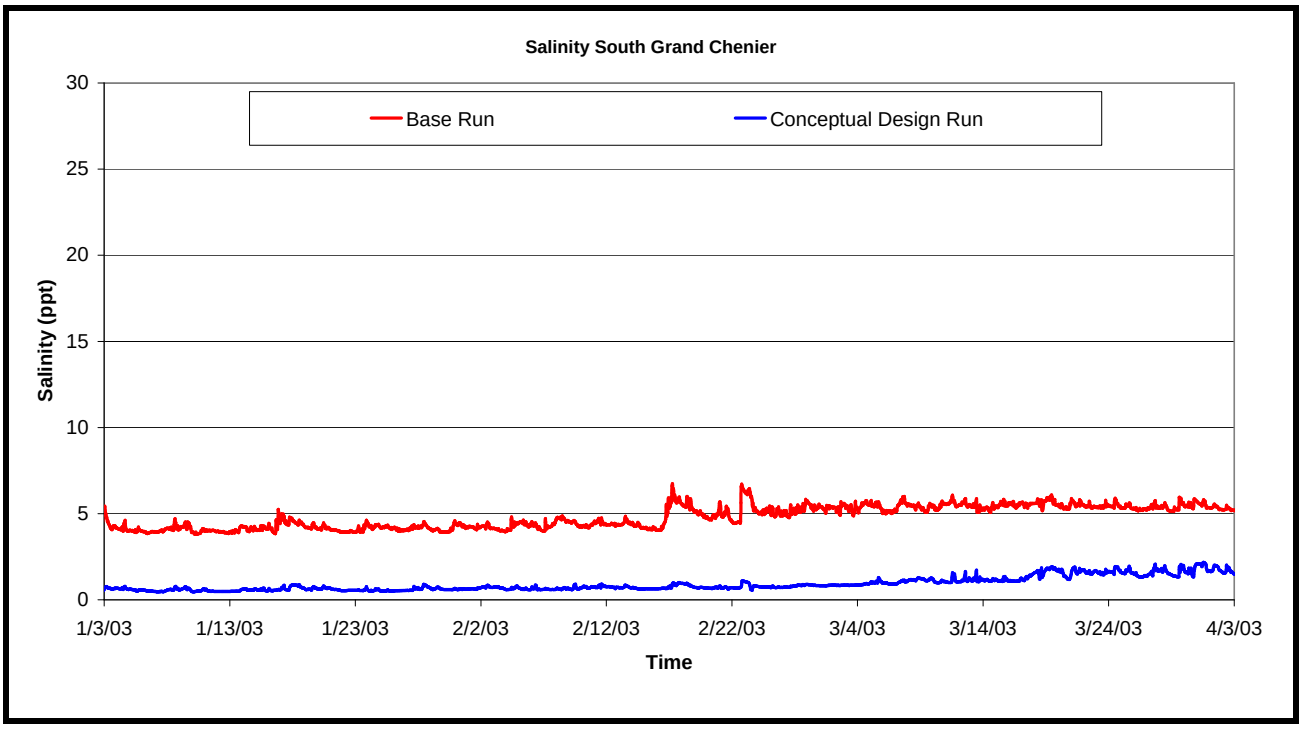


Figure A-27: Salinity Base Run Results Vs. Conceptual Design Run At Grand Chenier (Second Lake).

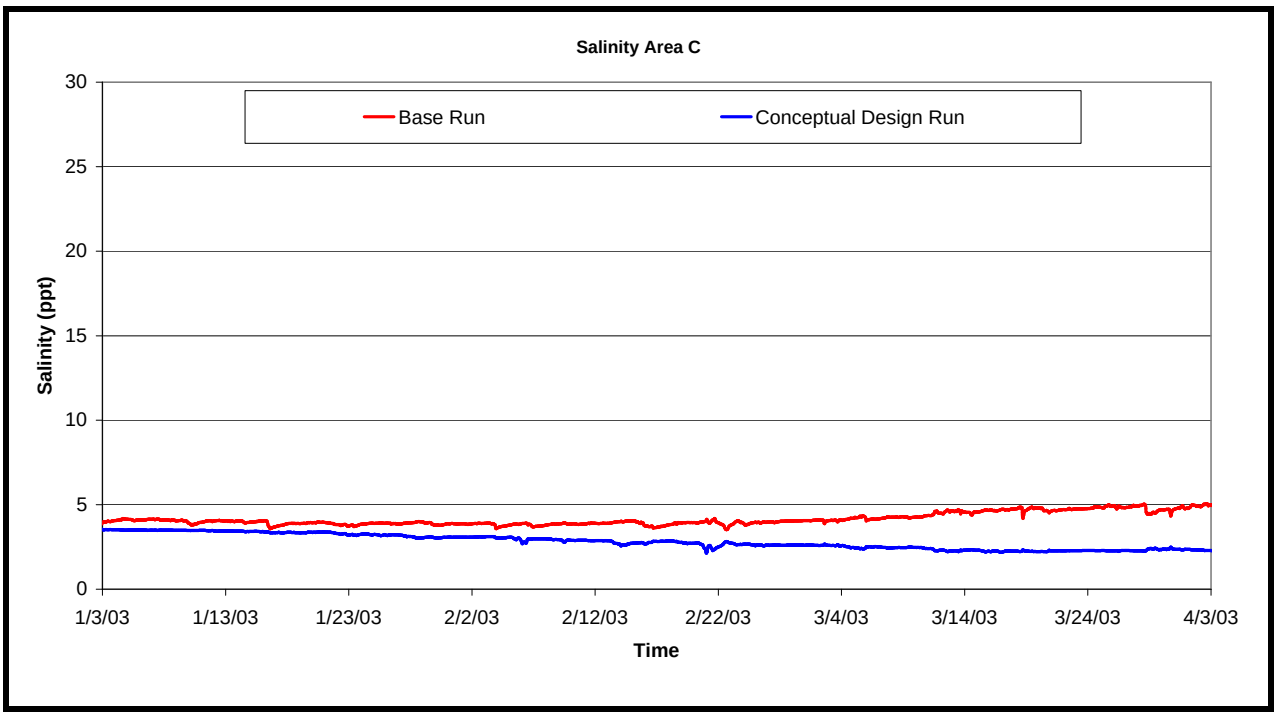


Figure A-28: Salinity Base Run Results Vs. Conceptual Design Run At Area C (Grand Chenier).

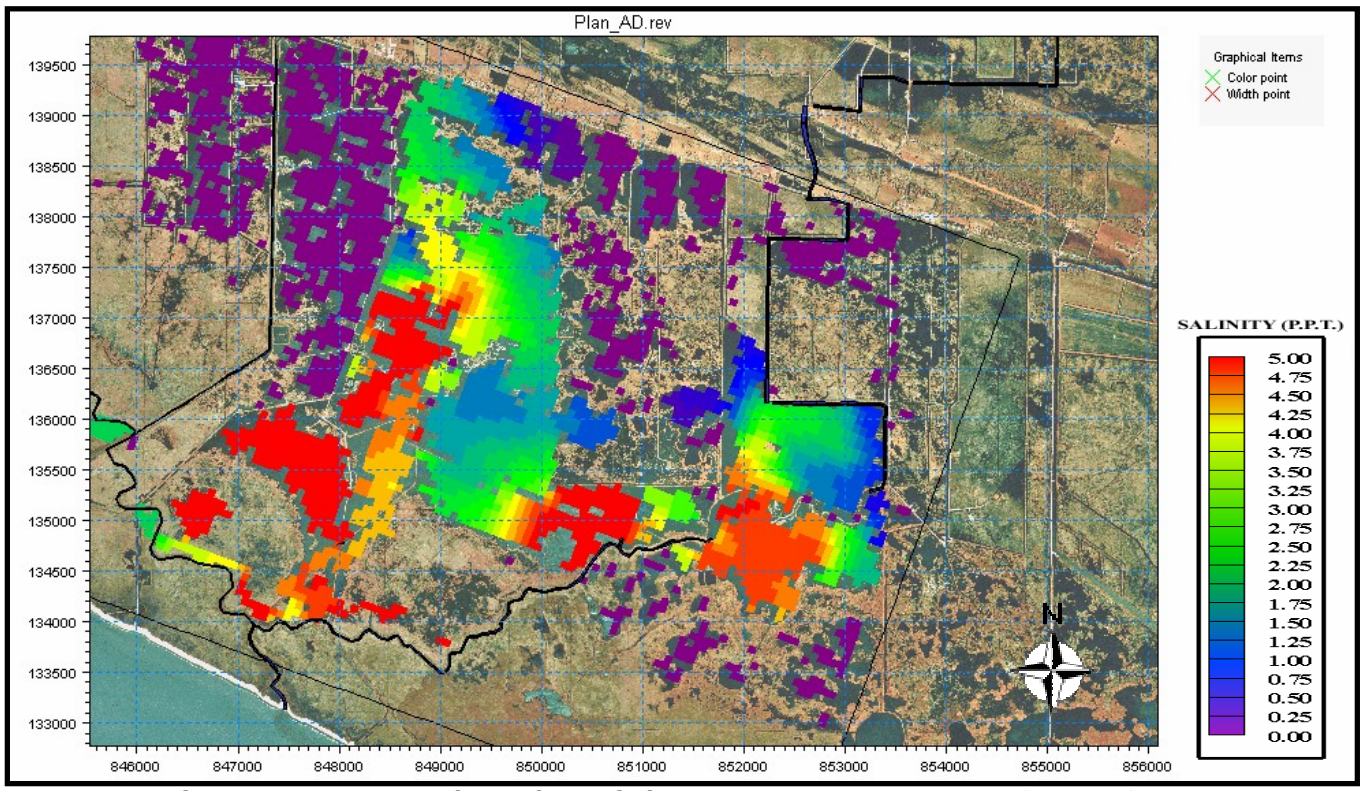


Figure A-29: Salinity Contour Map For The South Grand Chenier Area At 11/15/02 4:00 AM (Base Run)

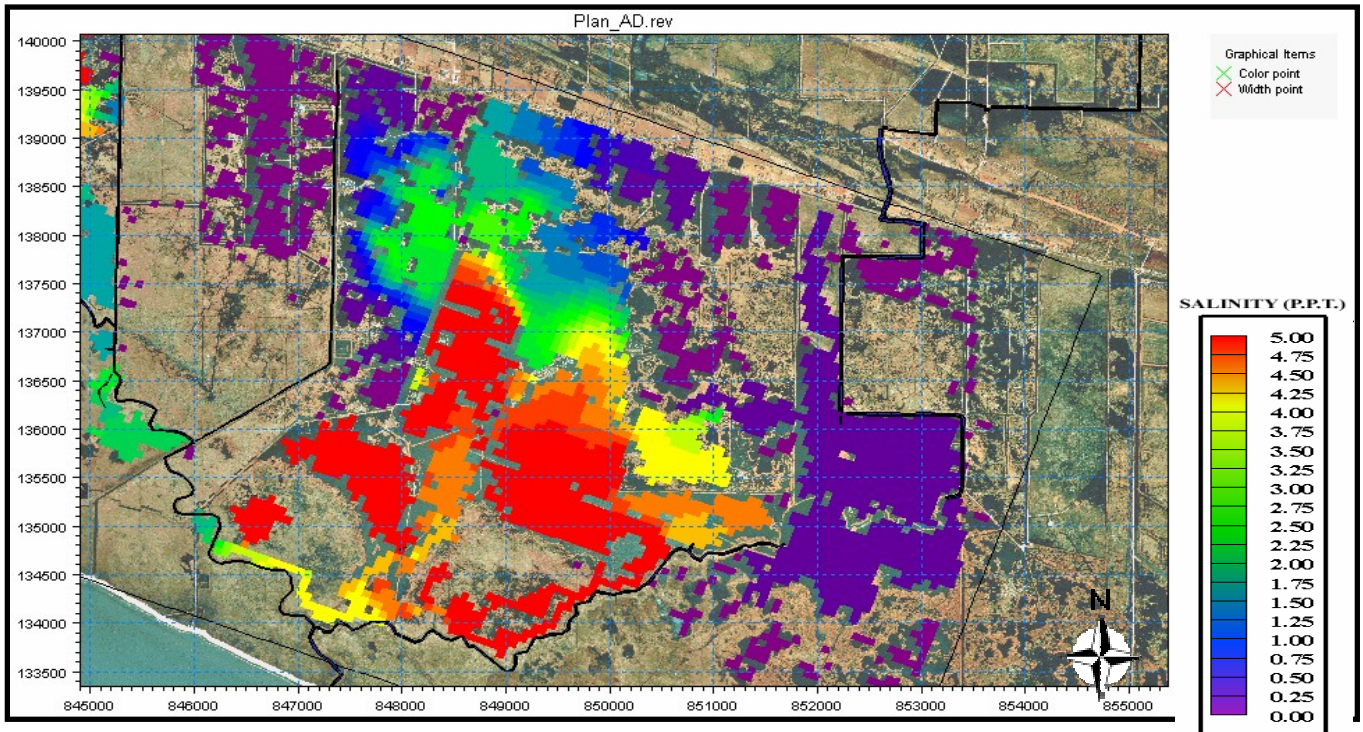


Figure A-30: Salinity Contour Map For The South Grand Chenier Area At 11/15/02 4:00 AM (Conceptual Design Run)

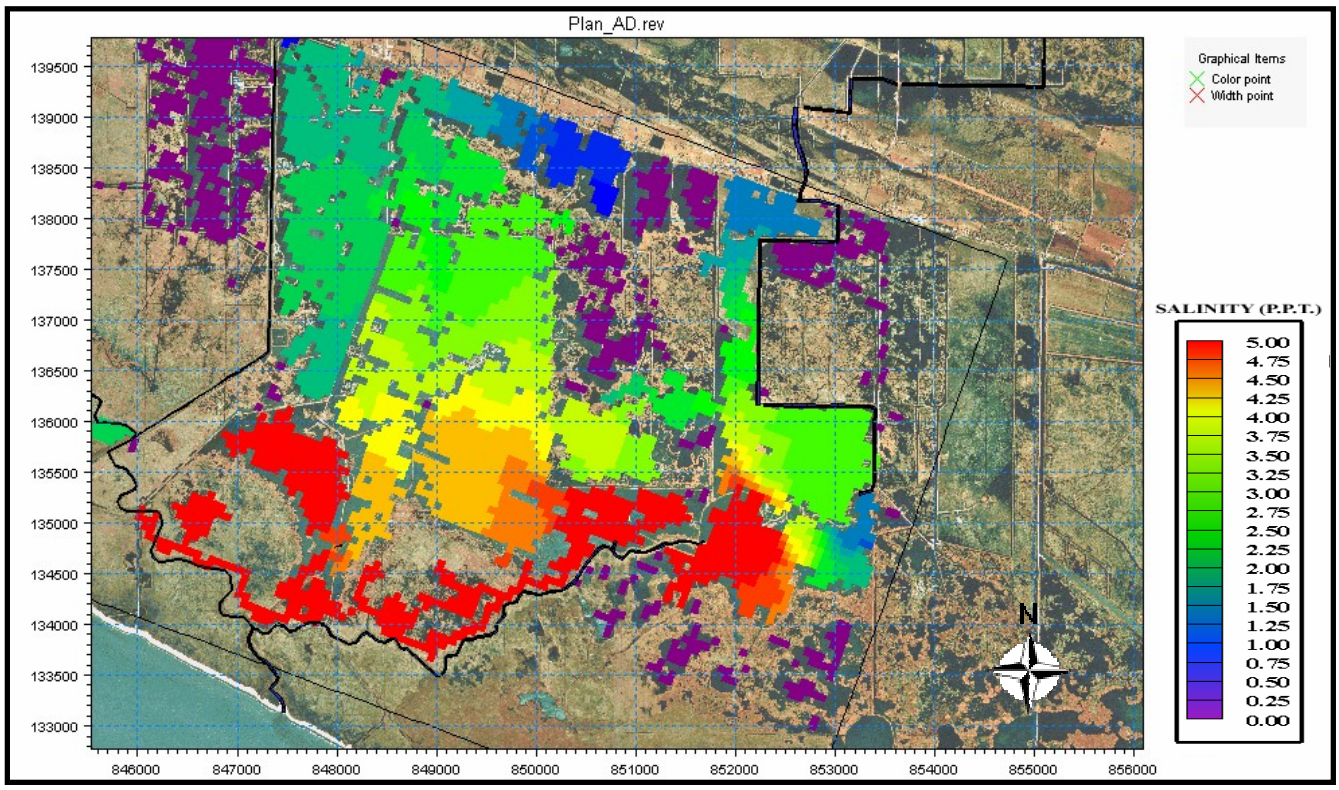


Figure A-31: Salinity Contour Map For The South Grand Chenier Area At 01/03/03 3:00 AM (Base Run)

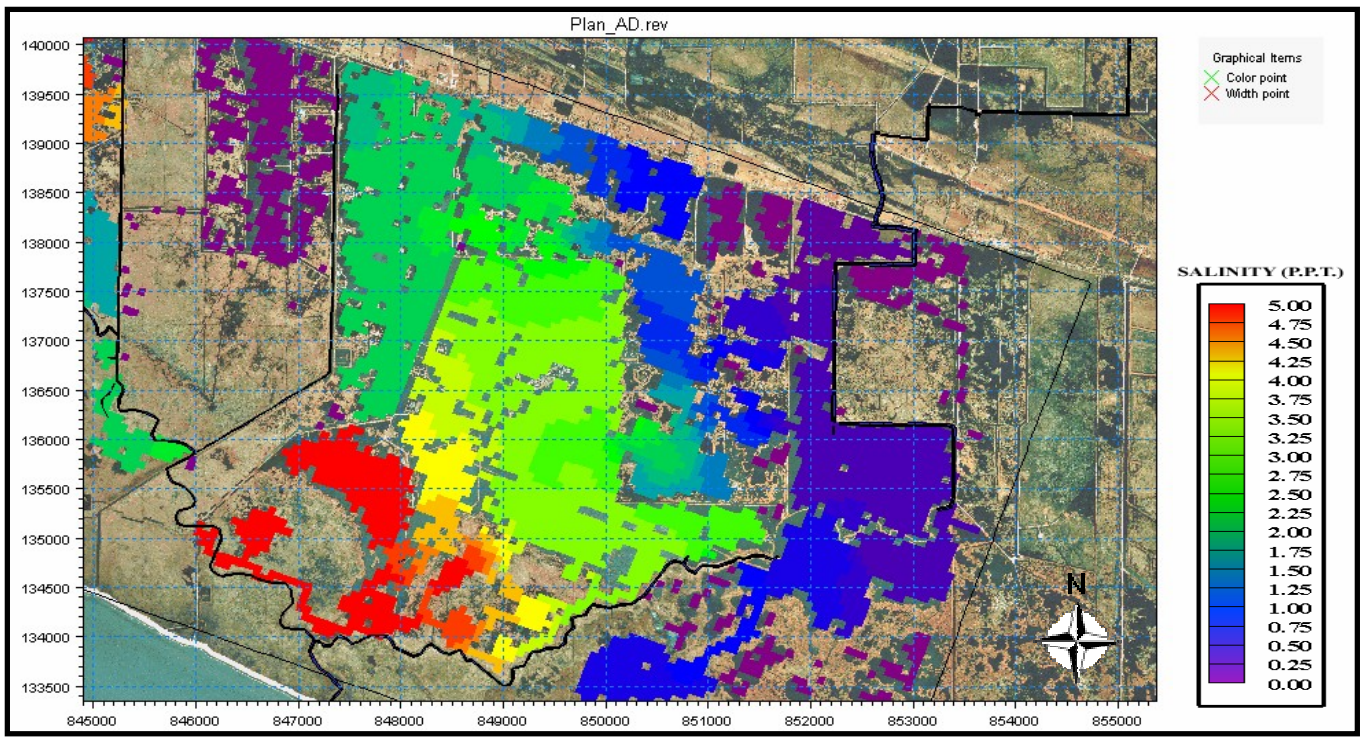


Figure A-32: Salinity Contour Map For The South Grand Chenier Area At 01/03/03 3:00 AM (Conceptual Design Run)

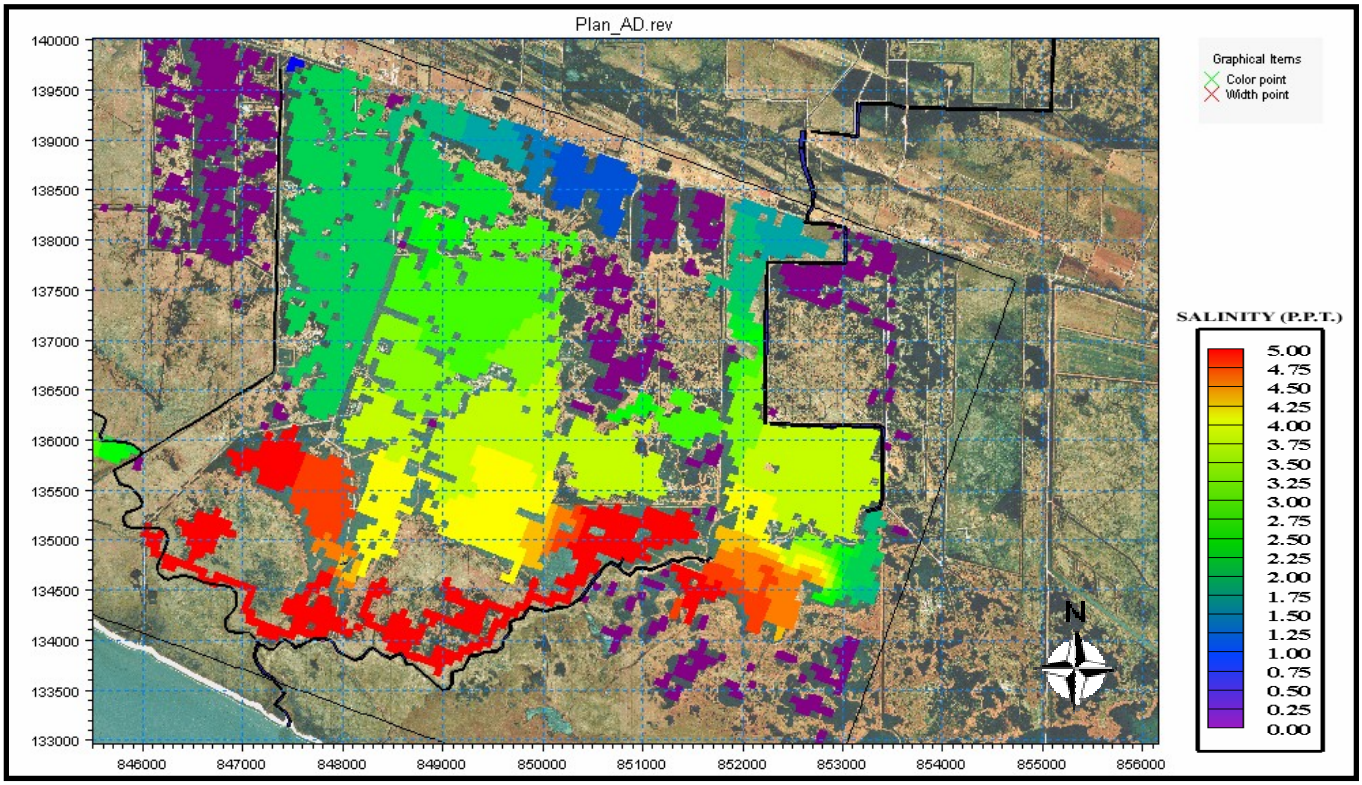


Figure A-33: Salinity Contour Map For The South Grand Chenier Area At 02/03/03 9:00 AM (Base Run)

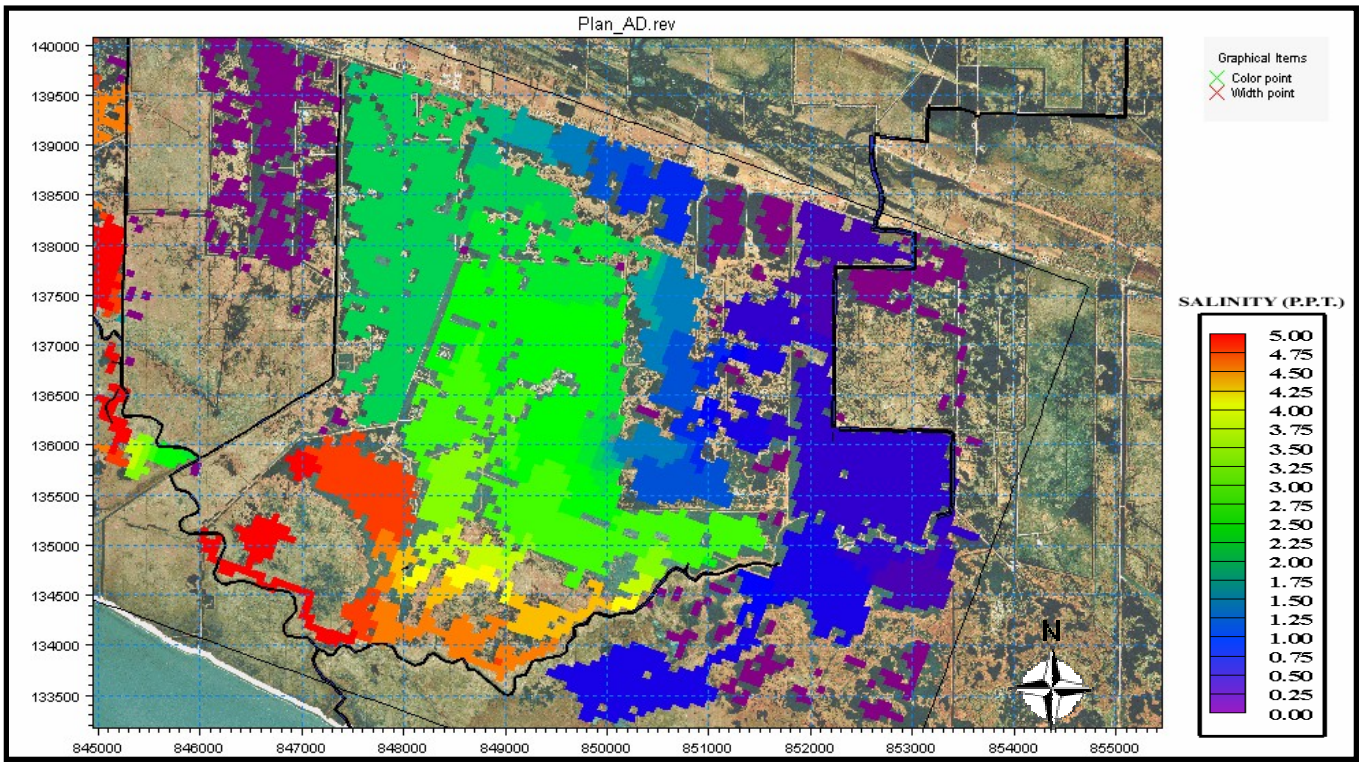


Figure A-34: Salinity Contour Map For The South Grand Chenier Area At 02/03/03 9:00 AM (Conceptual Design Run)

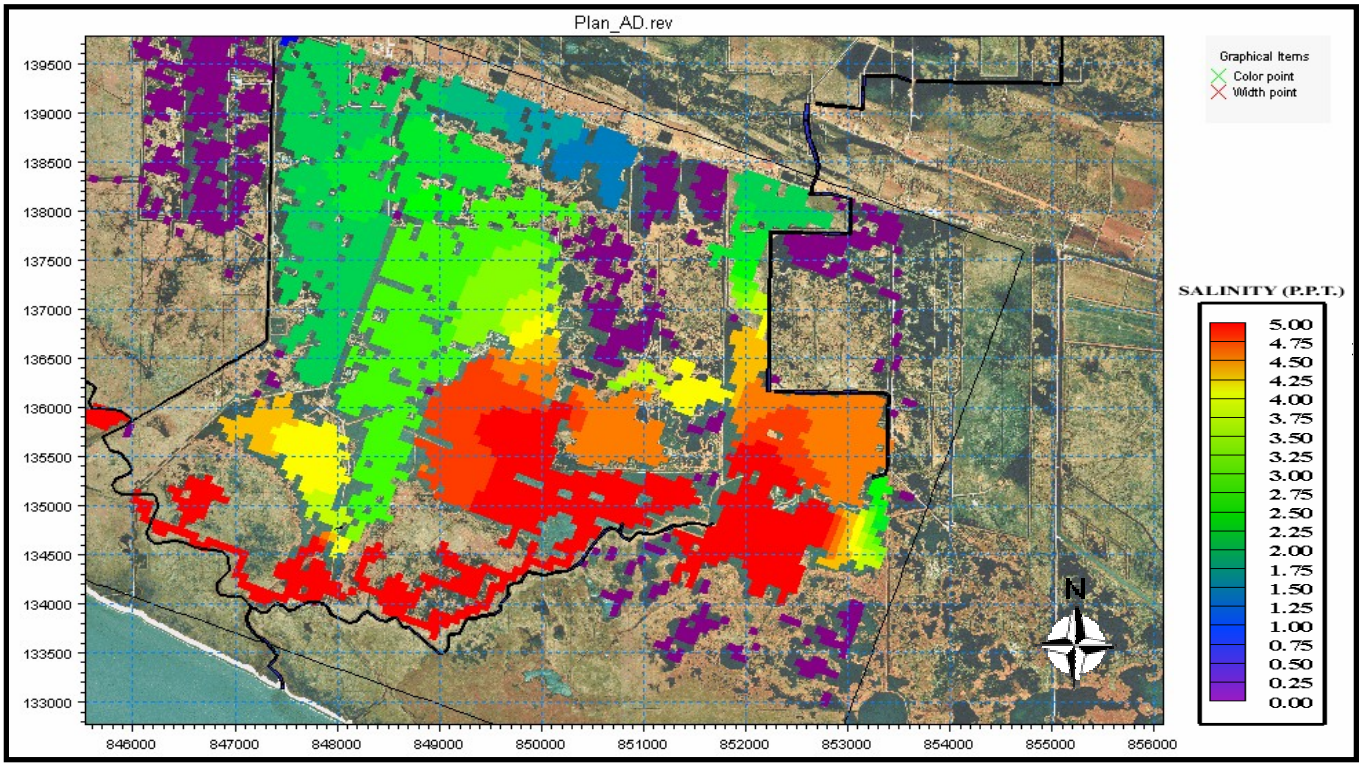


Figure A-35: Salinity Contour Map For The South Grand Chenier Area At 03/18/03 3:00 PM (Base Run)

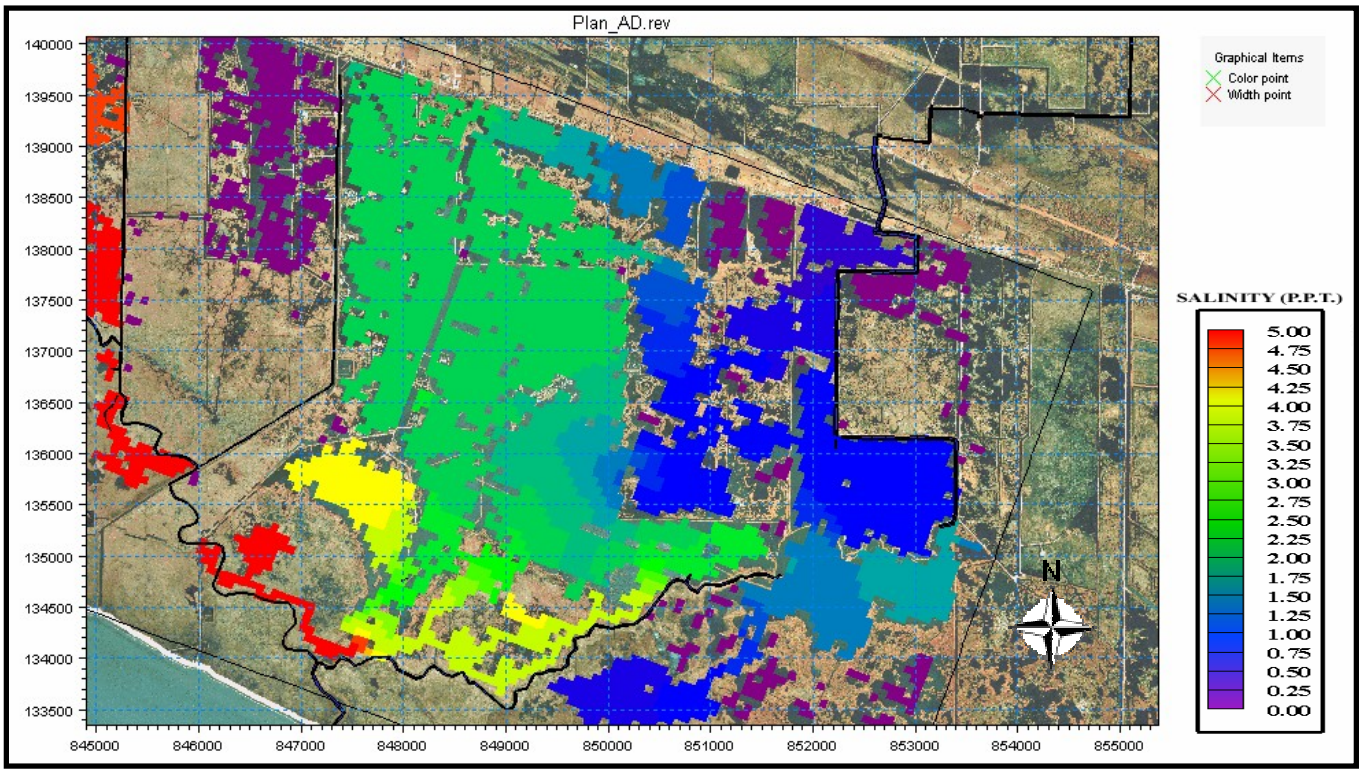


Figure A-36: Salinity Contour Map For The South Grand Chenier Area At 03/18/03 3:00 PM (Conceptual Design Run)

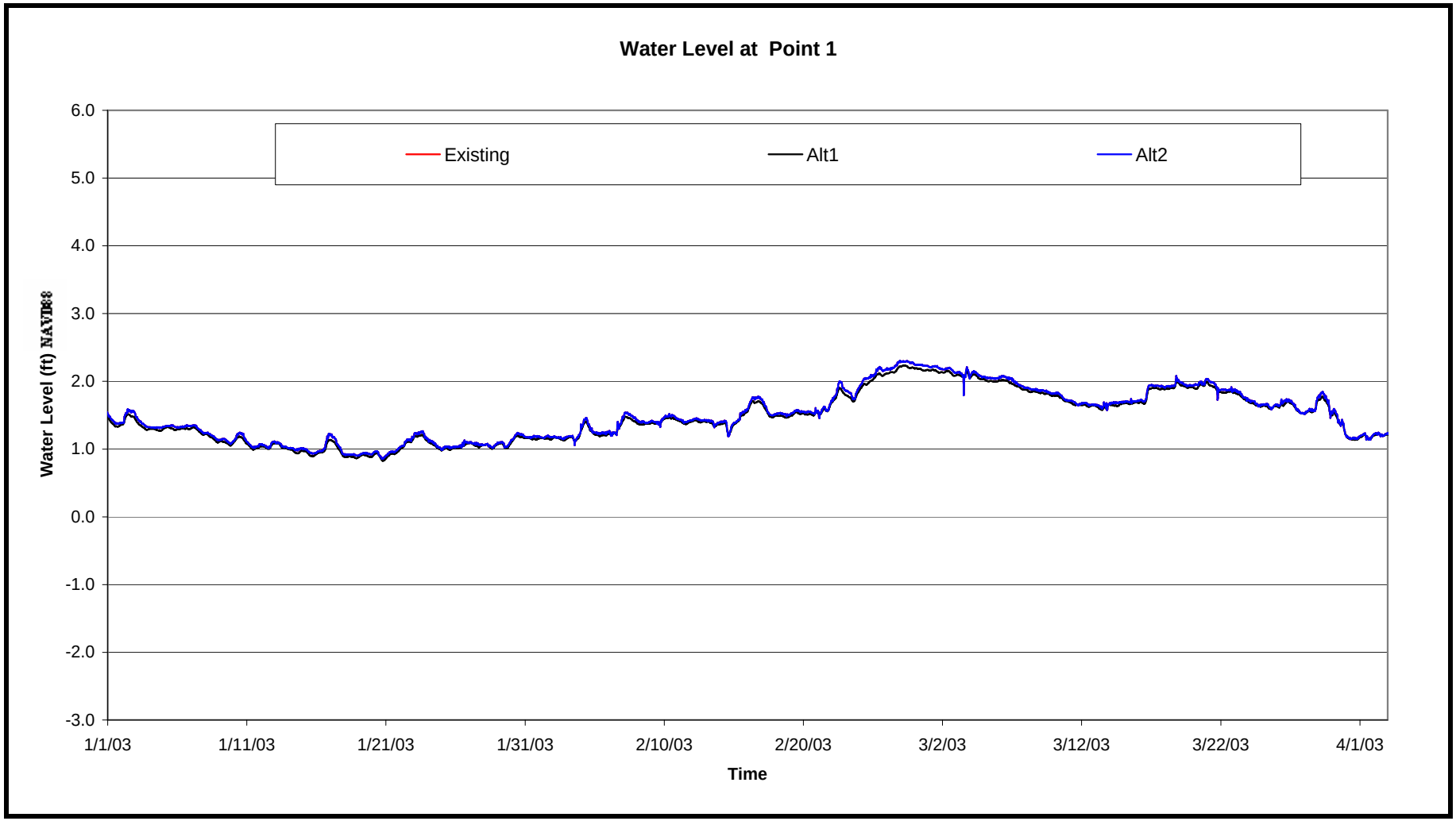


Figure A-37: Water Level Results At Point No.1

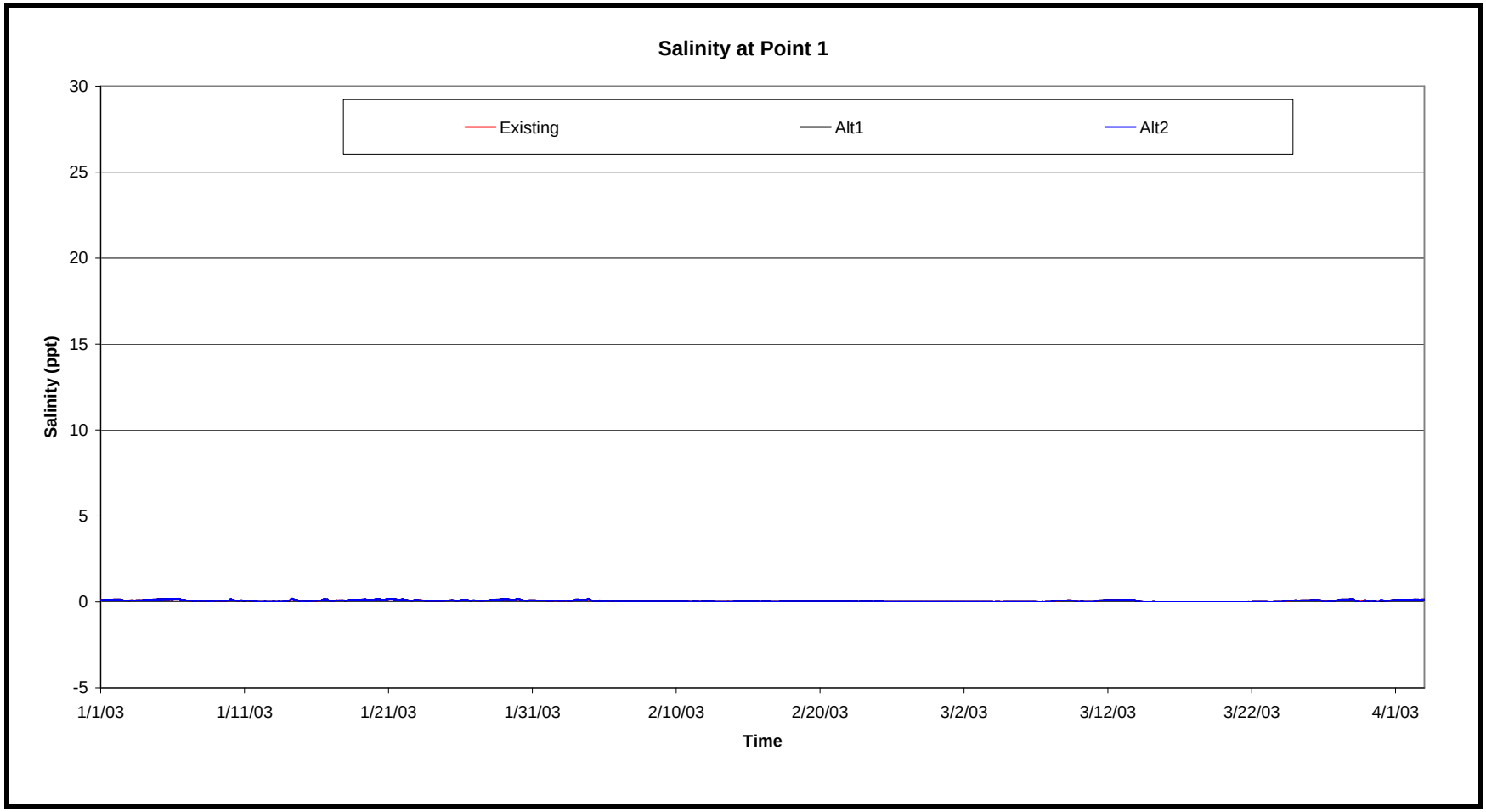


Figure A-38: Salinity Results At Point No.1

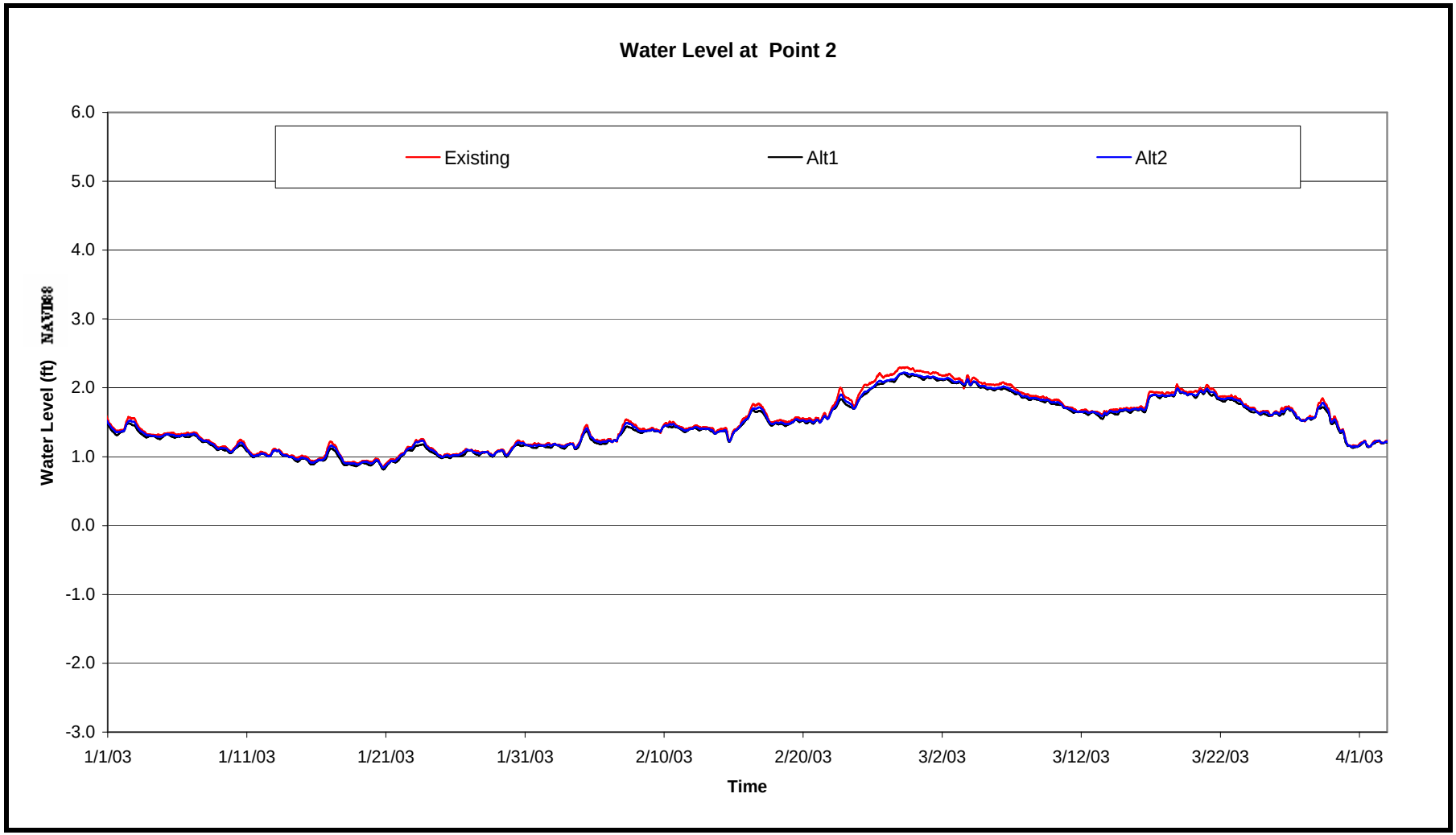


Figure A-39: Water Level Results At Point No.2

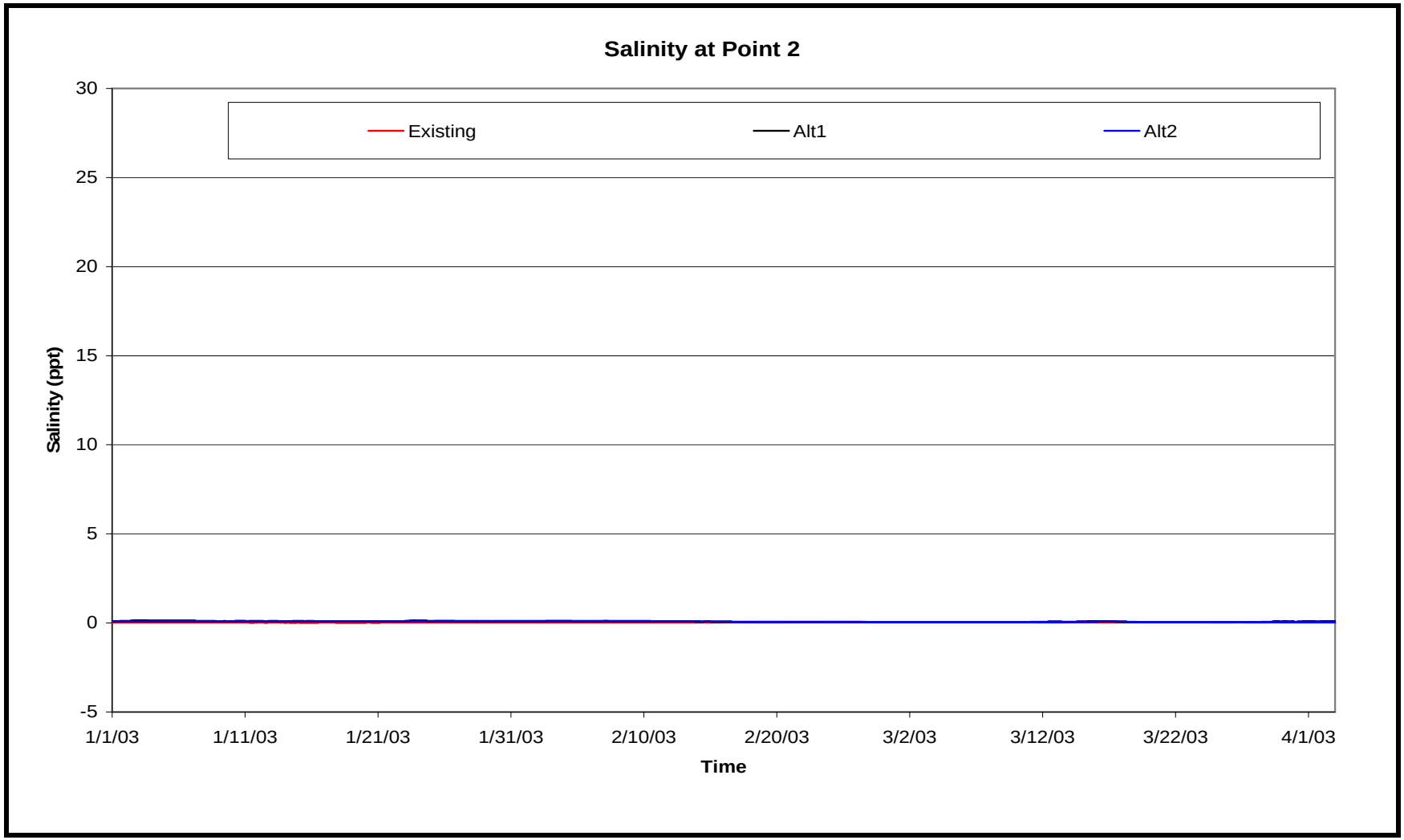


Figure A-40: Salinity Results At Point No.2

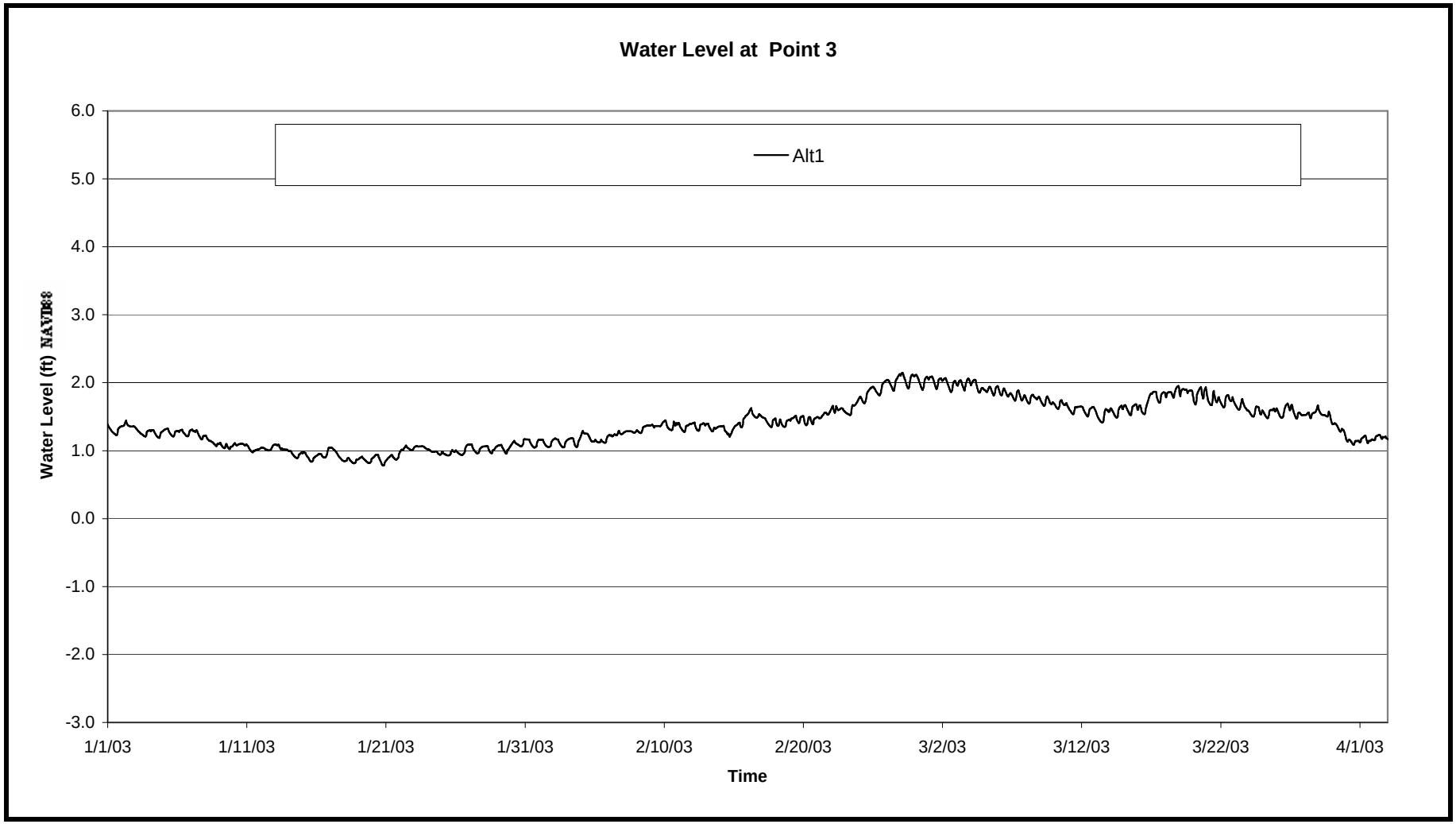


Figure A-41: Water Level Results At Point No.3

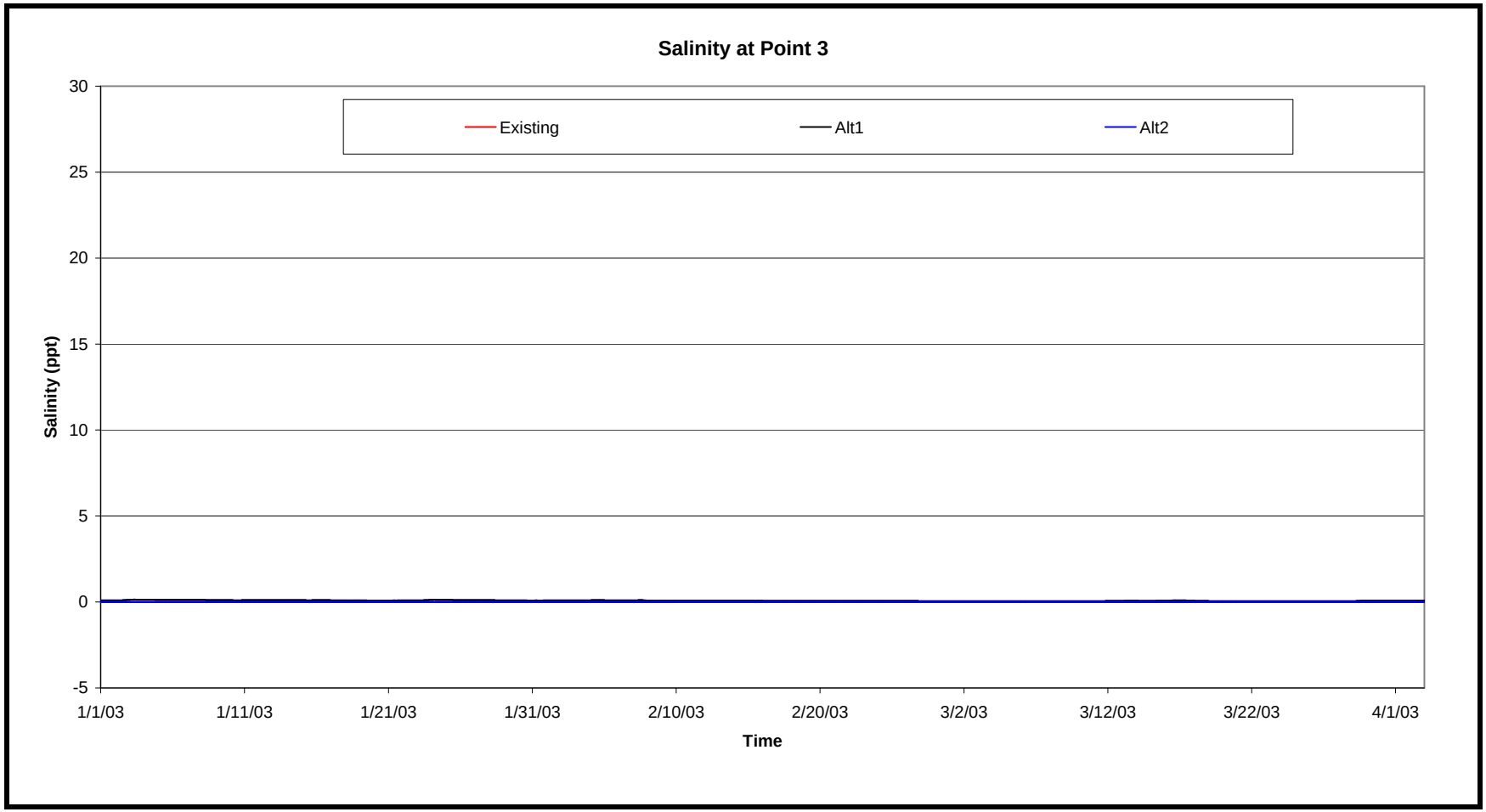


Figure A-42: Salinity Results At Point No.3

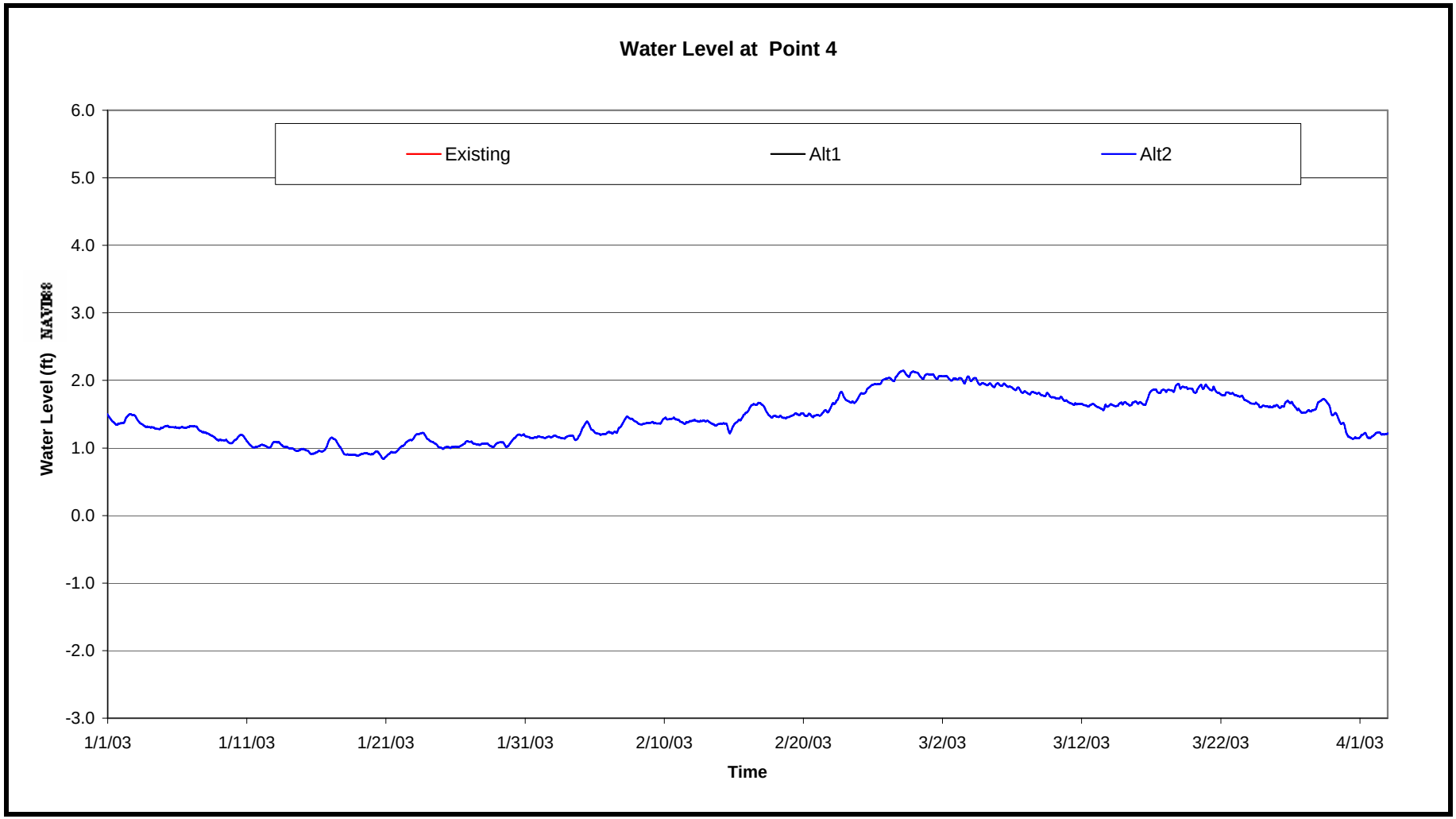


Figure A-43: Water Level Results At Point No.4

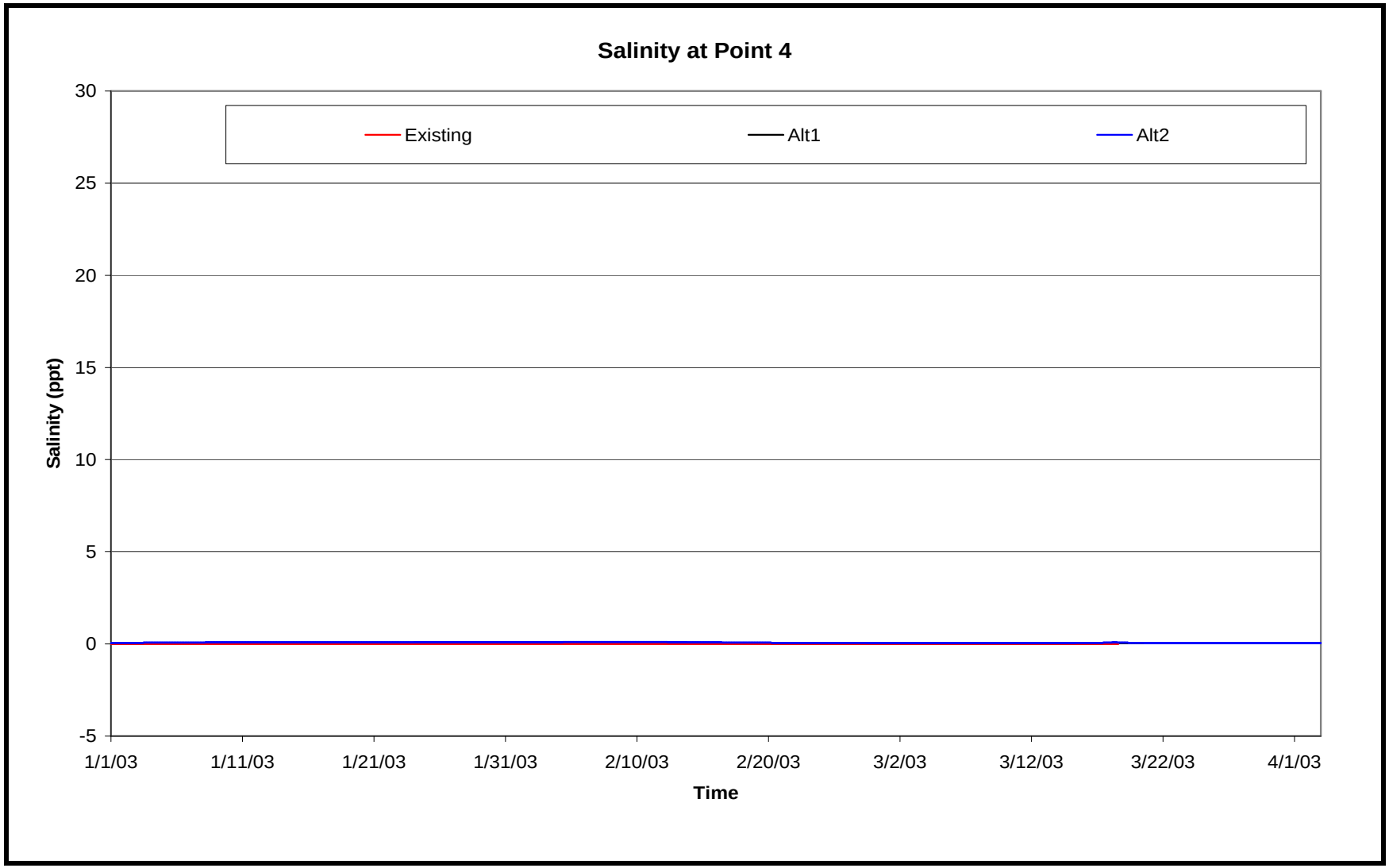


Figure A-44: Salinity Results At Point No.4

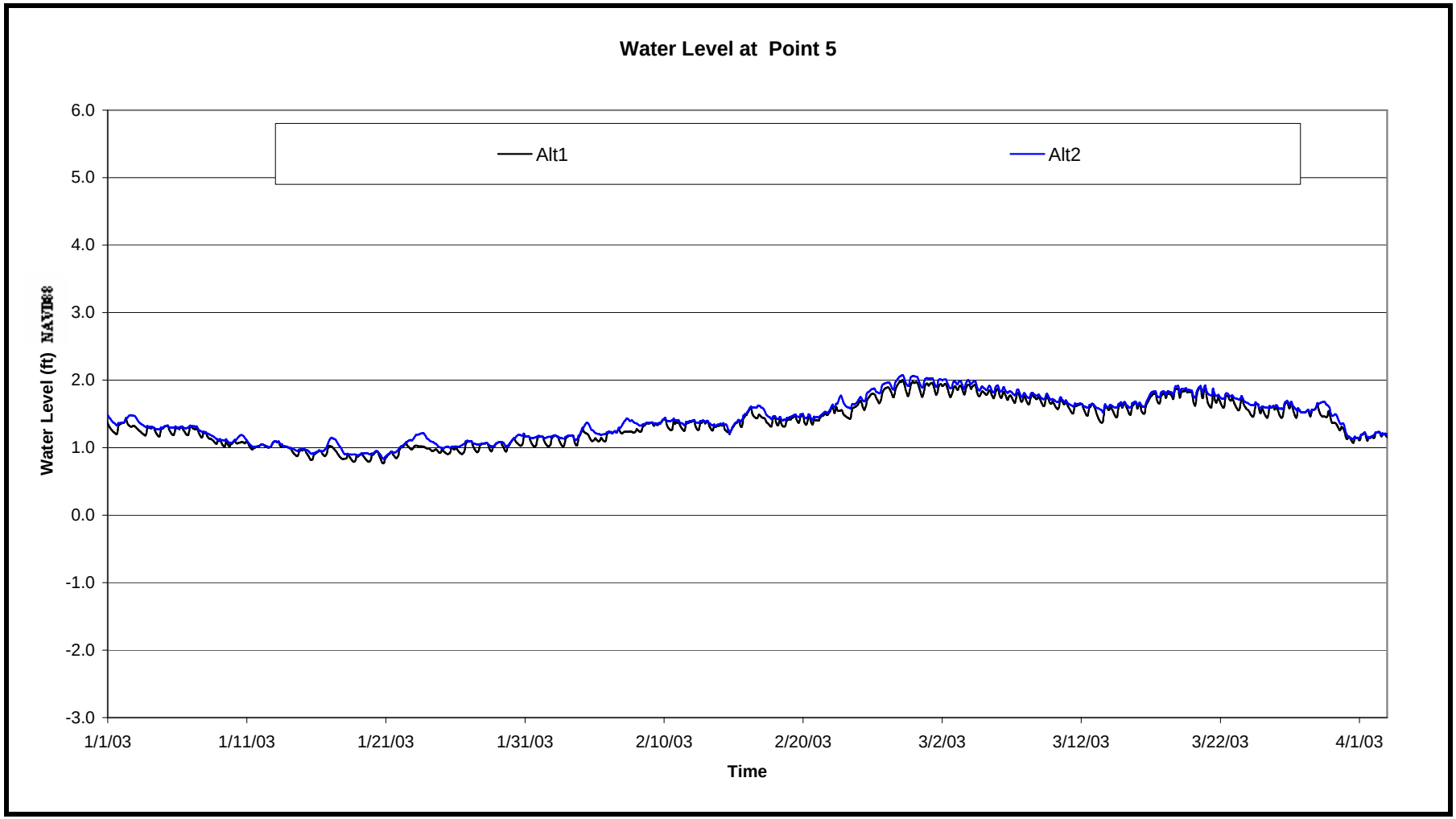


Figure A-45: Water Level Results At Point No.5

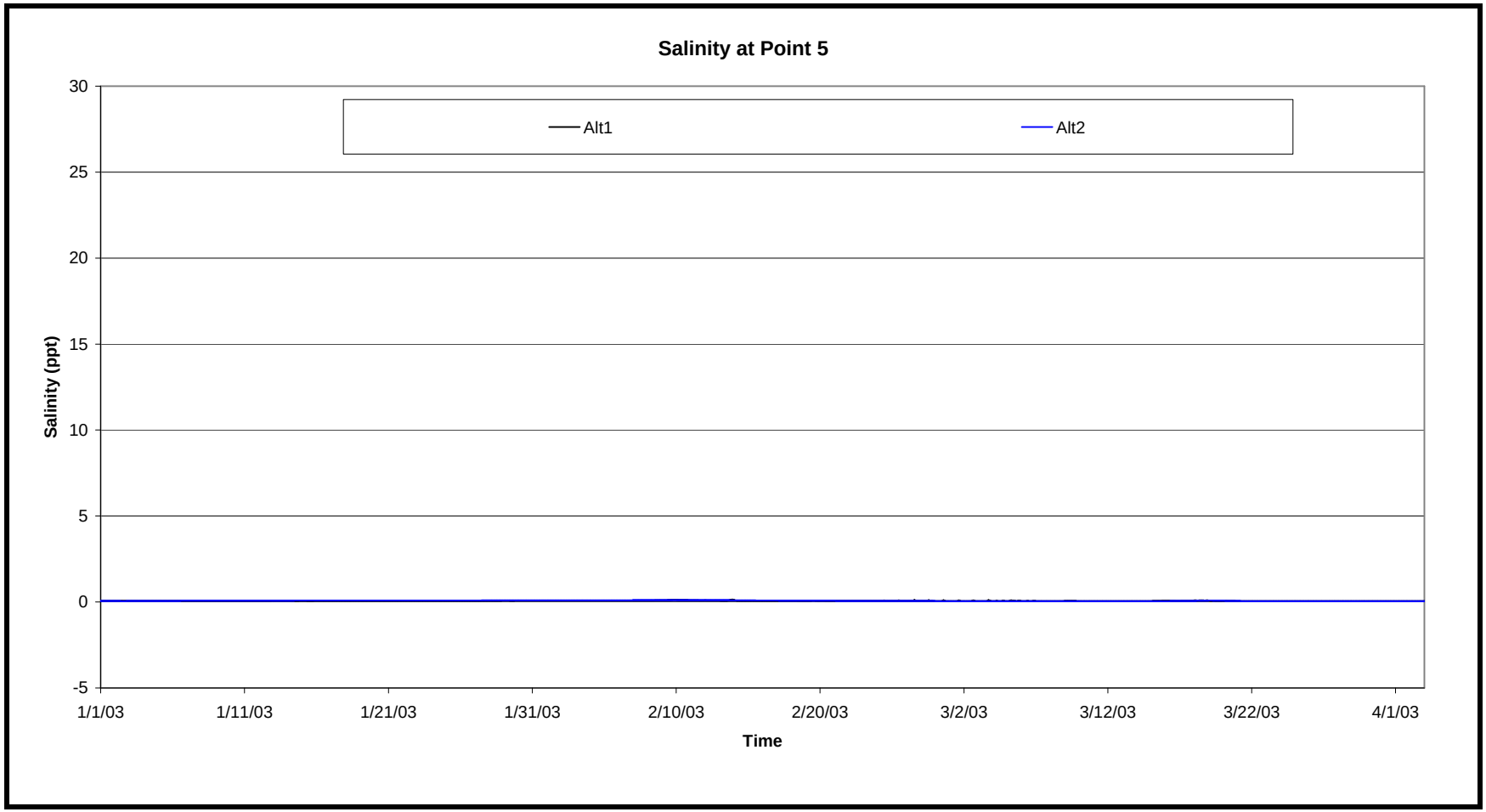


Figure A-46: Salinity Results At Point No.5

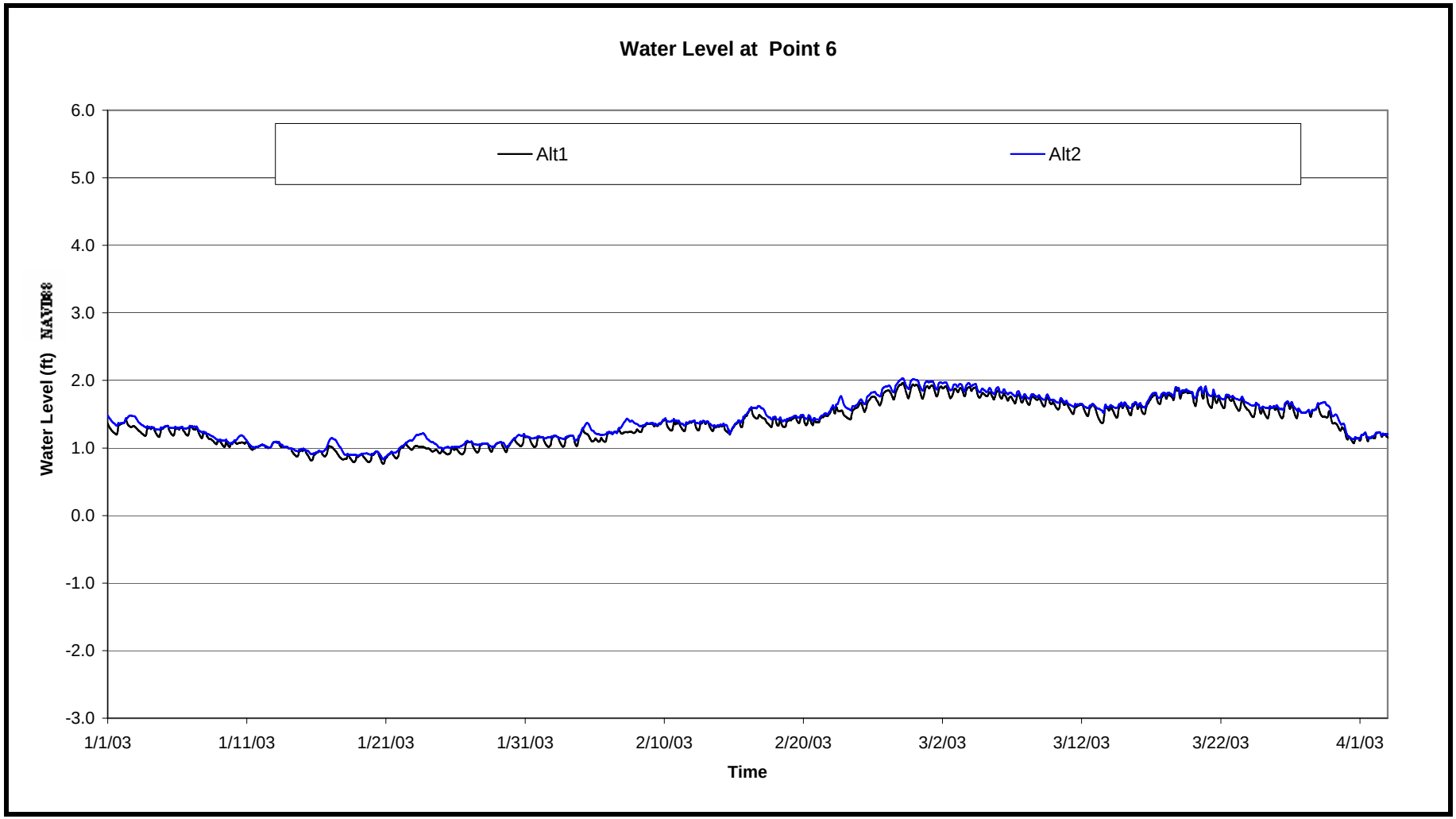


Figure A-47: Water Level Results At Point No.6

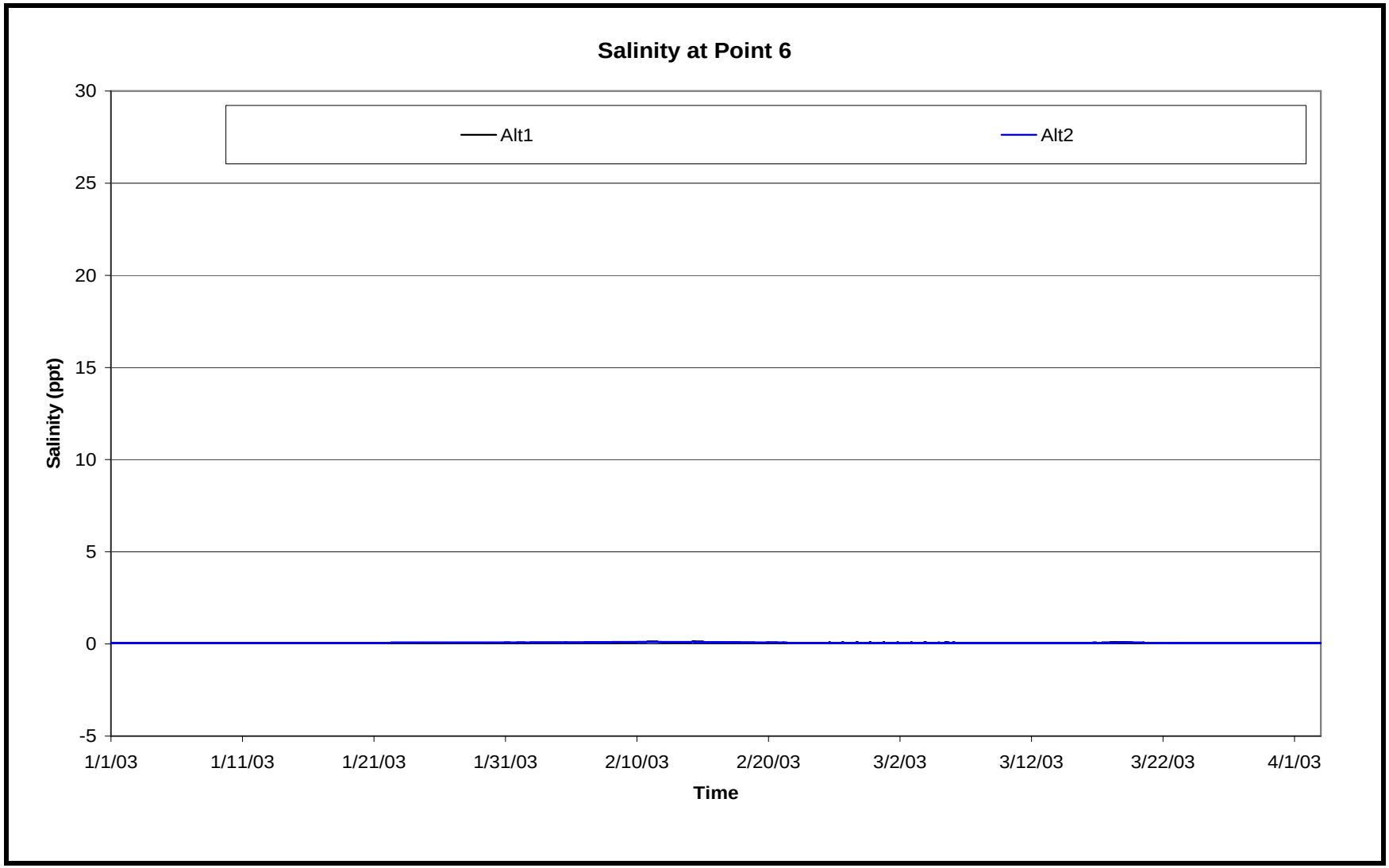


Figure A-48: Salinity Results At Point No.6

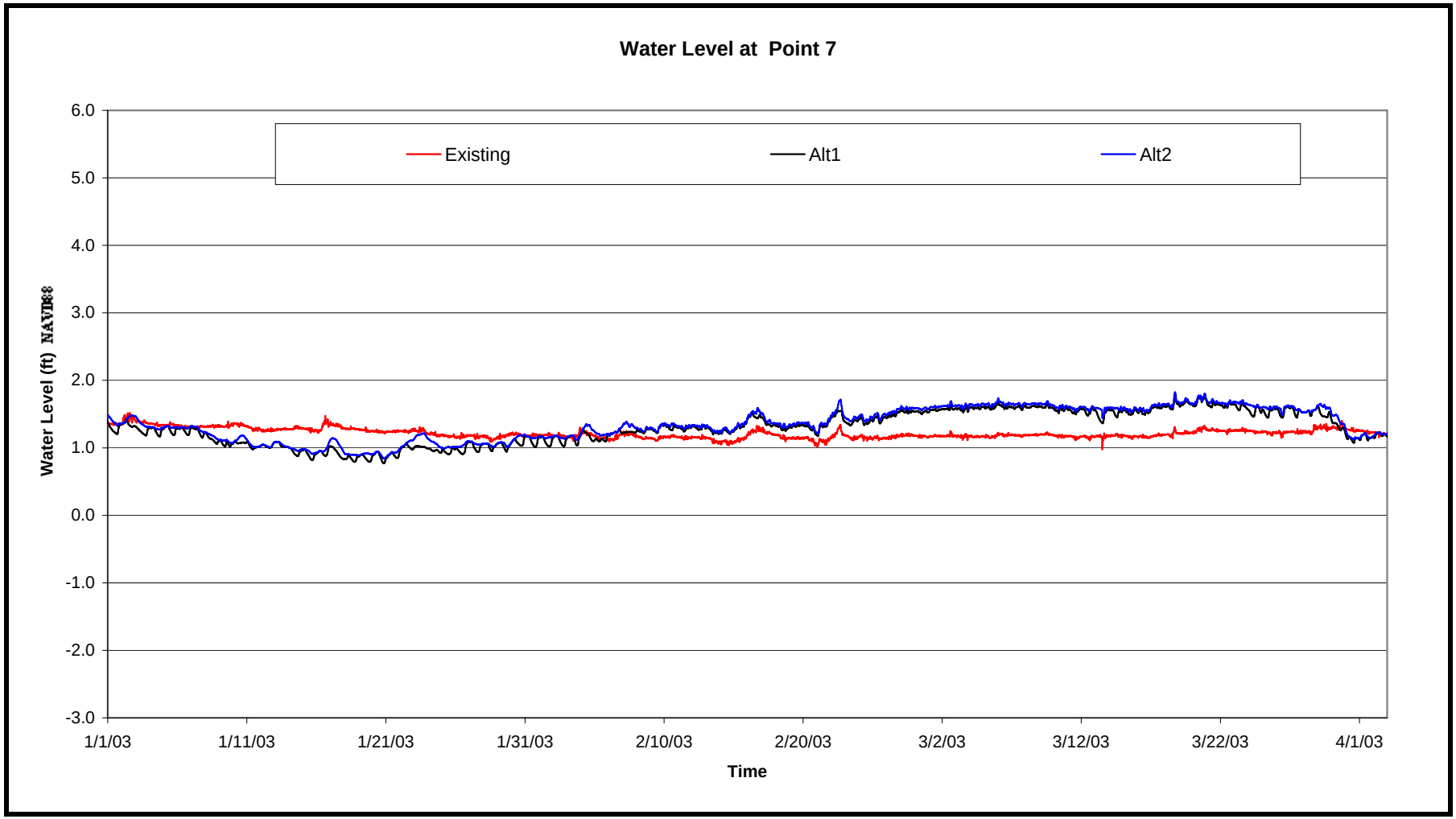


Figure A-49: Water Level Results At Point No.7

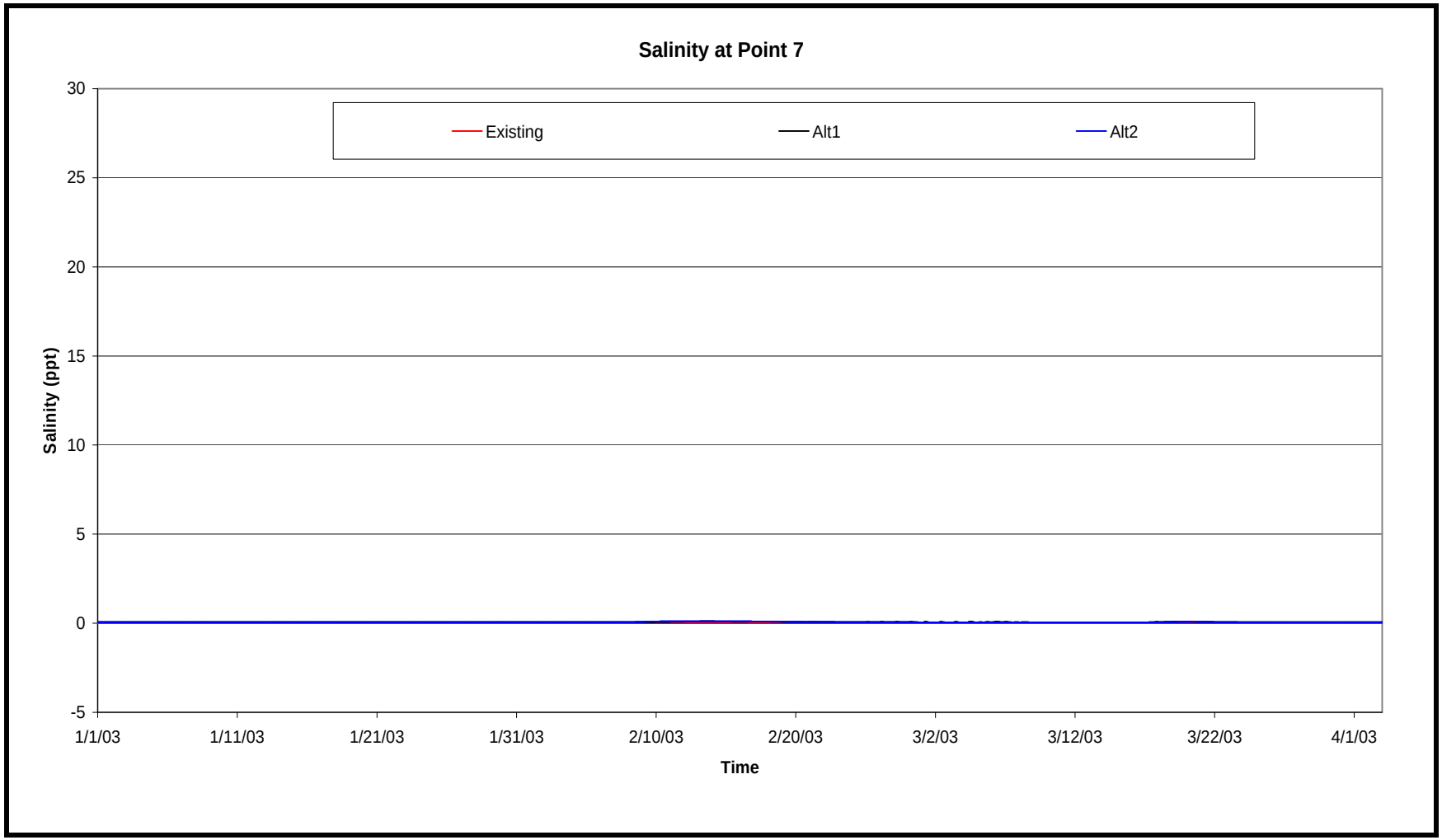


Figure A-50: Salinity Results At Point No.7

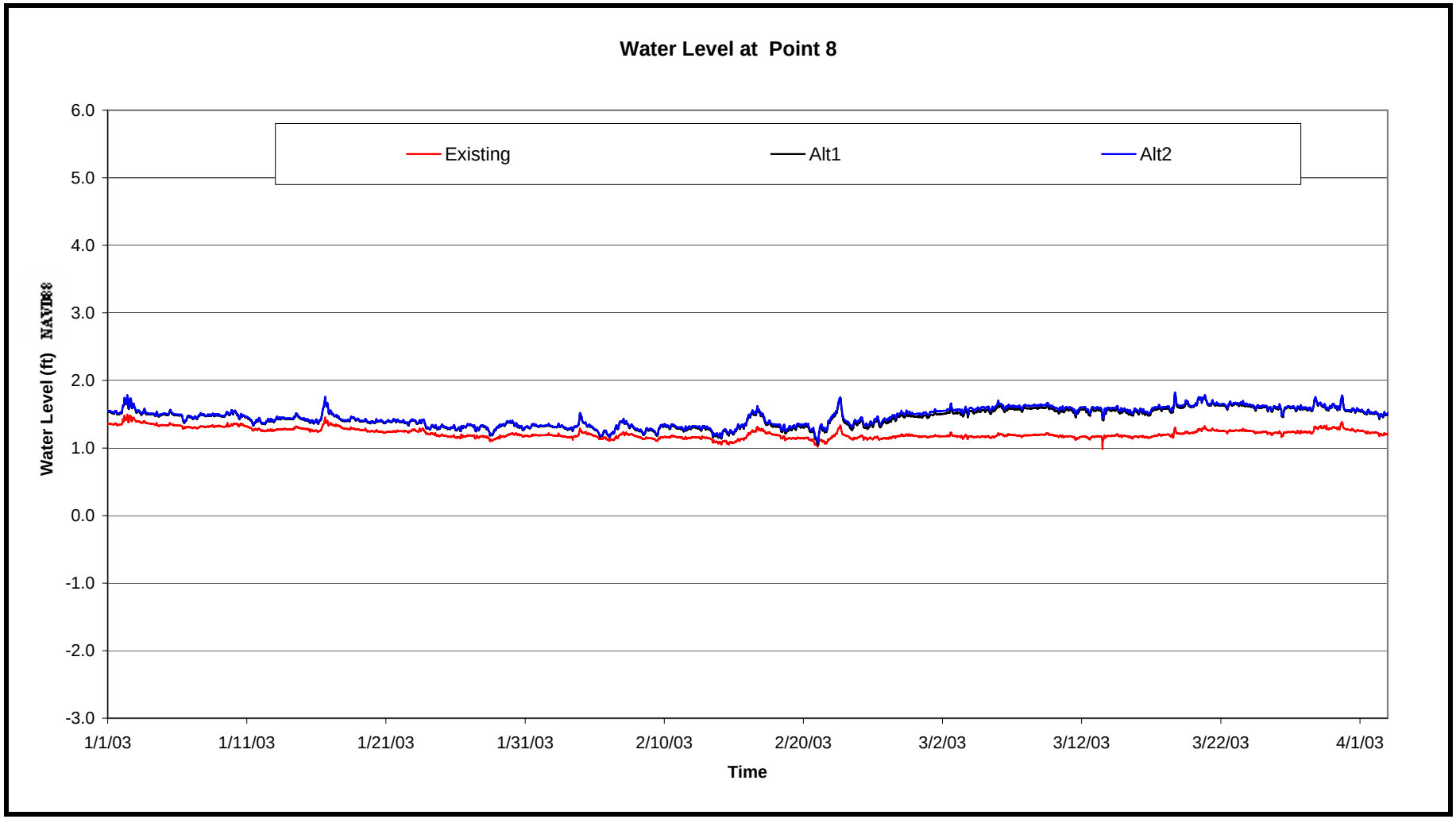


Figure A-51: Water Level Results At Point No.8

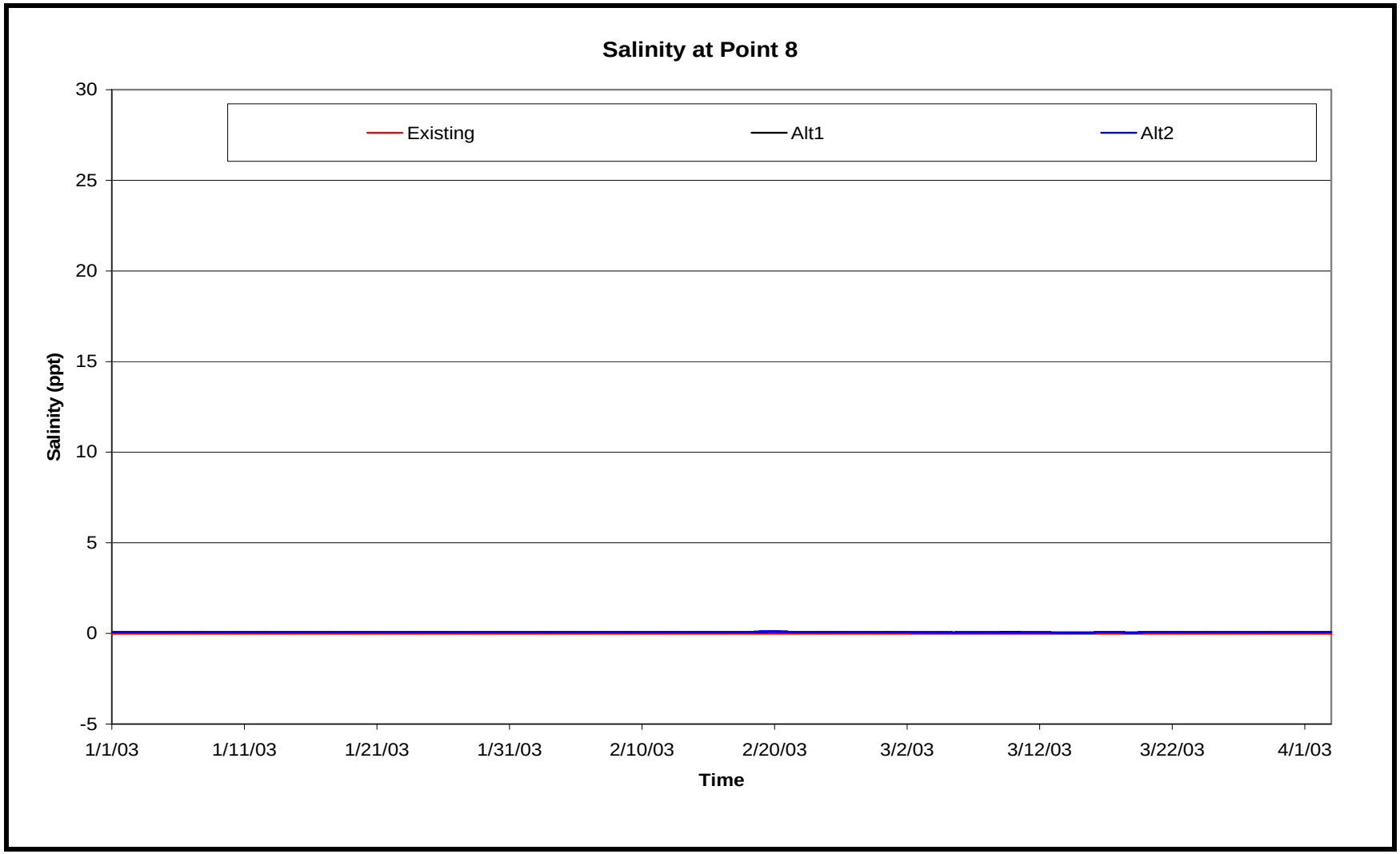


Figure A-52: Salinity Results At Point No.8

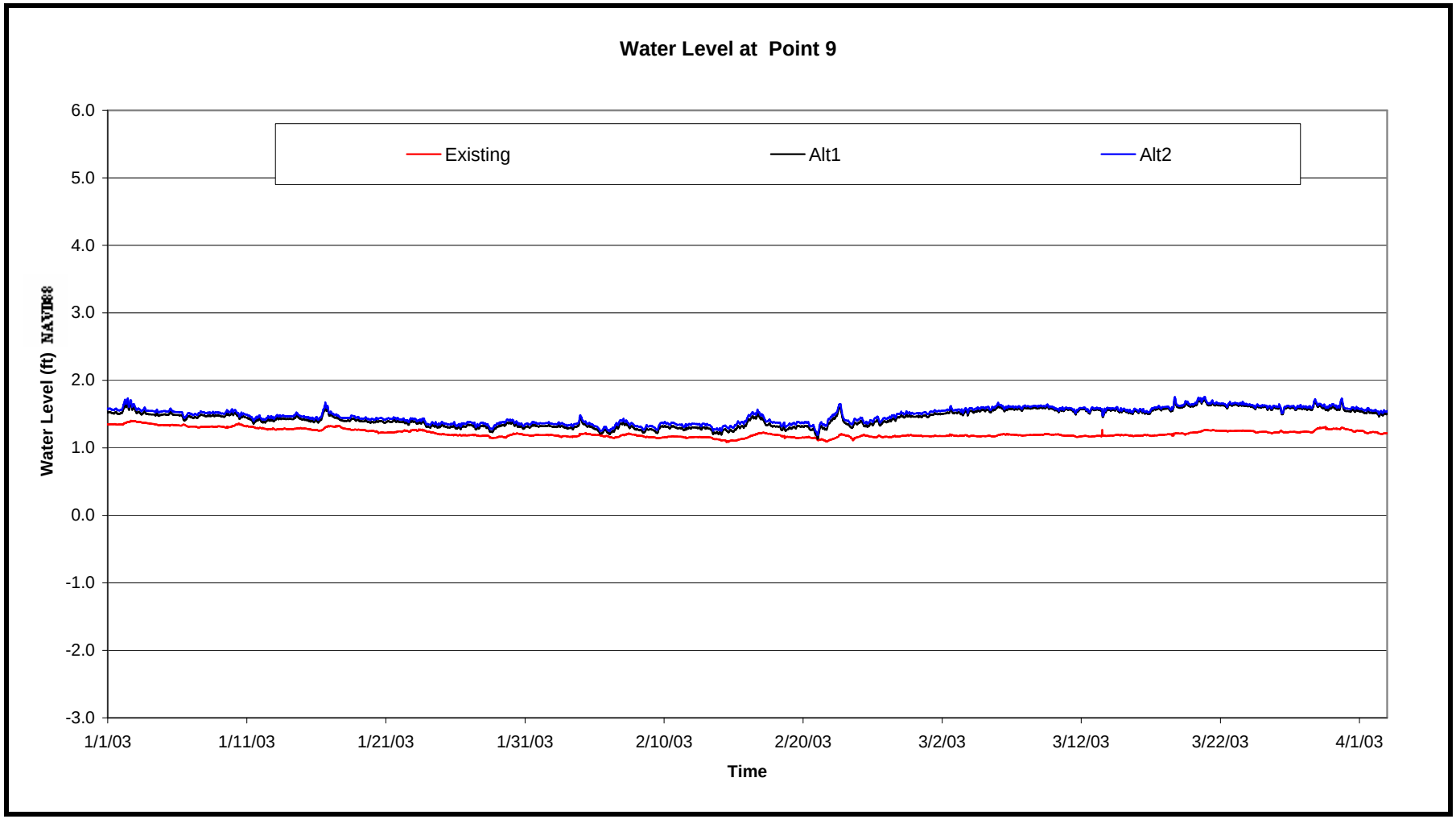


Figure A-53: Water Level Results At Point No.9

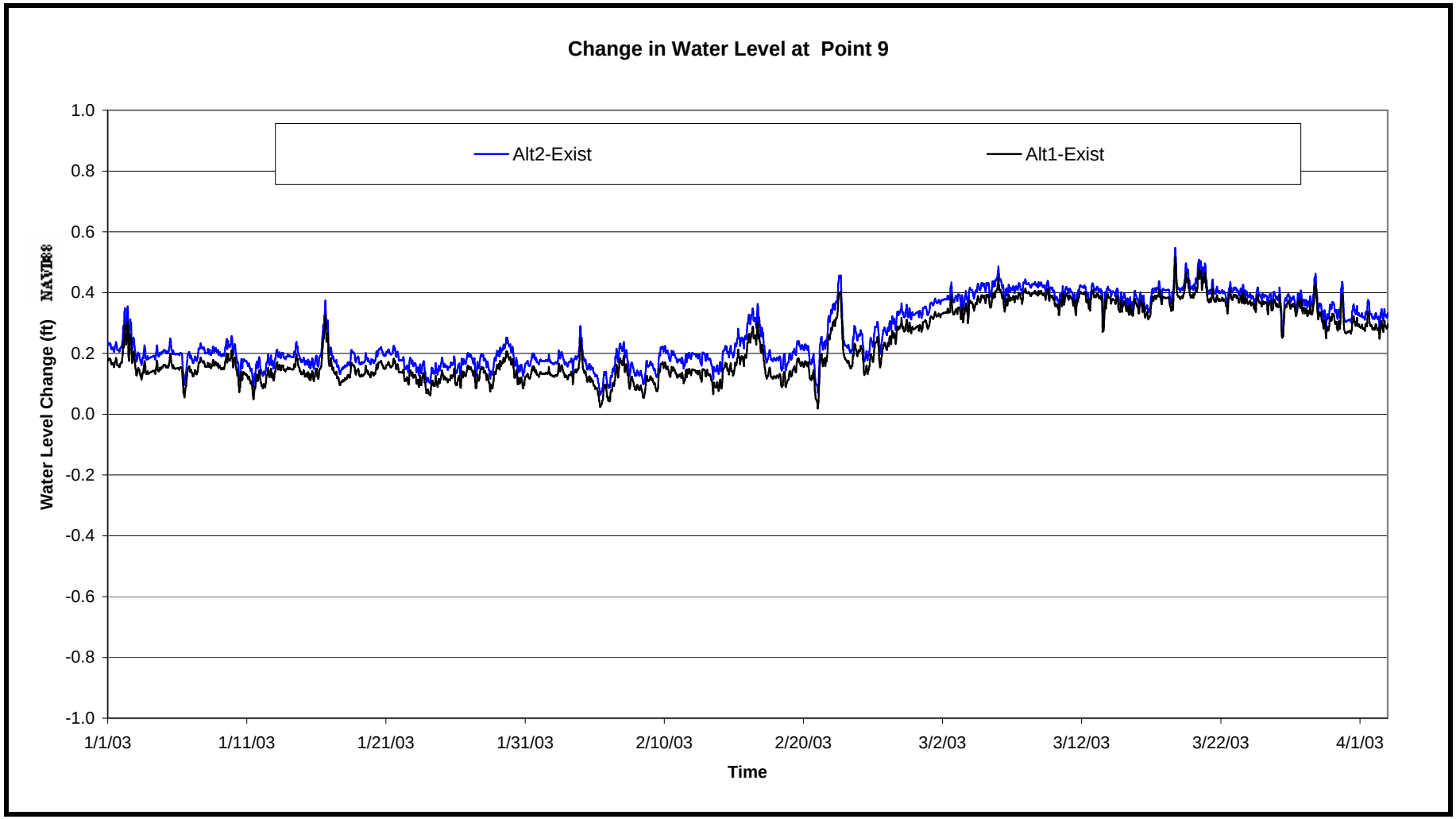


Figure A-54: Water Level Change Results At Point No.9

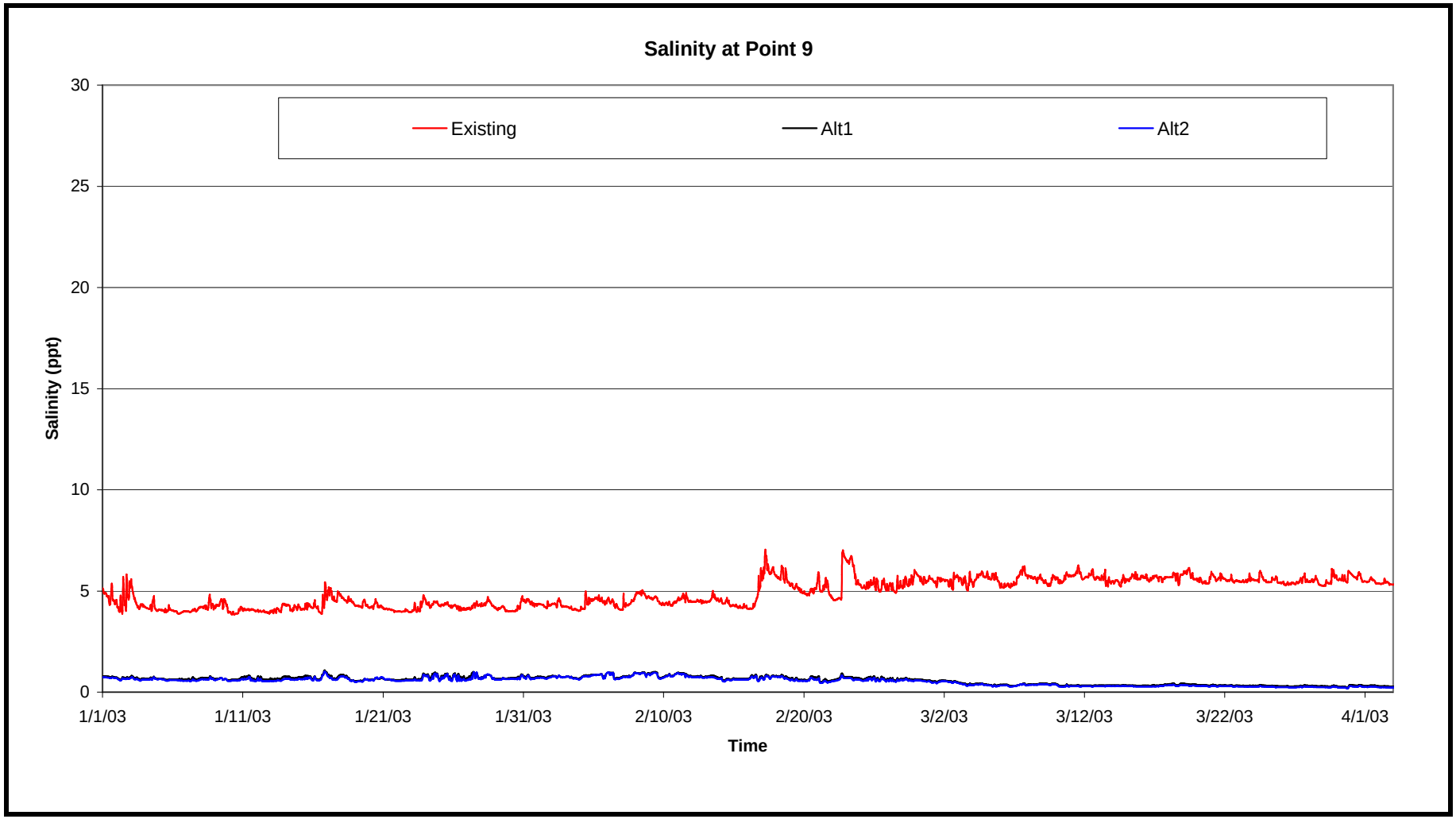


Figure A-55: Salinity Results At Point No.9

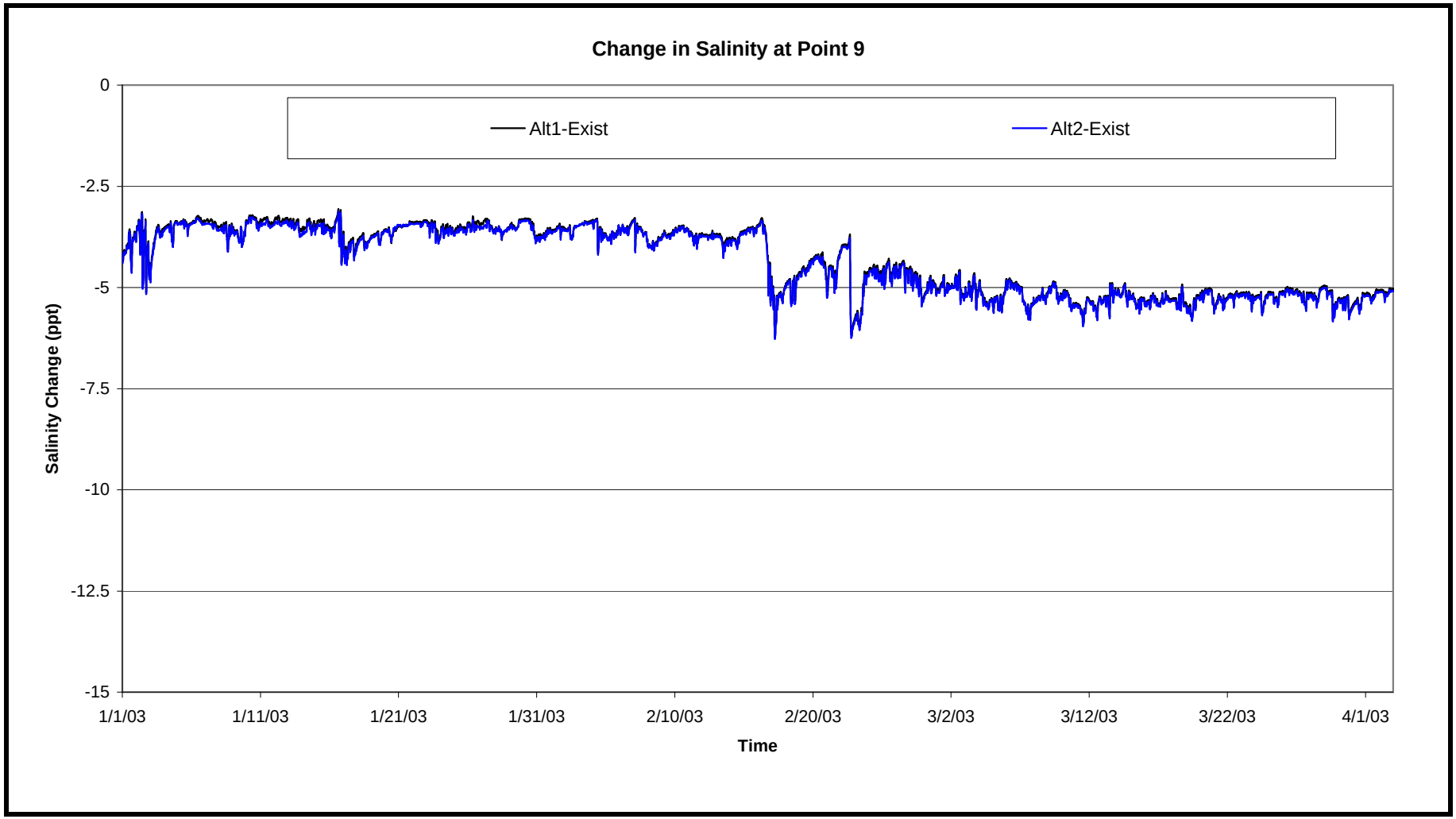


Figure A-56: Salinity Change Results At Point No.9

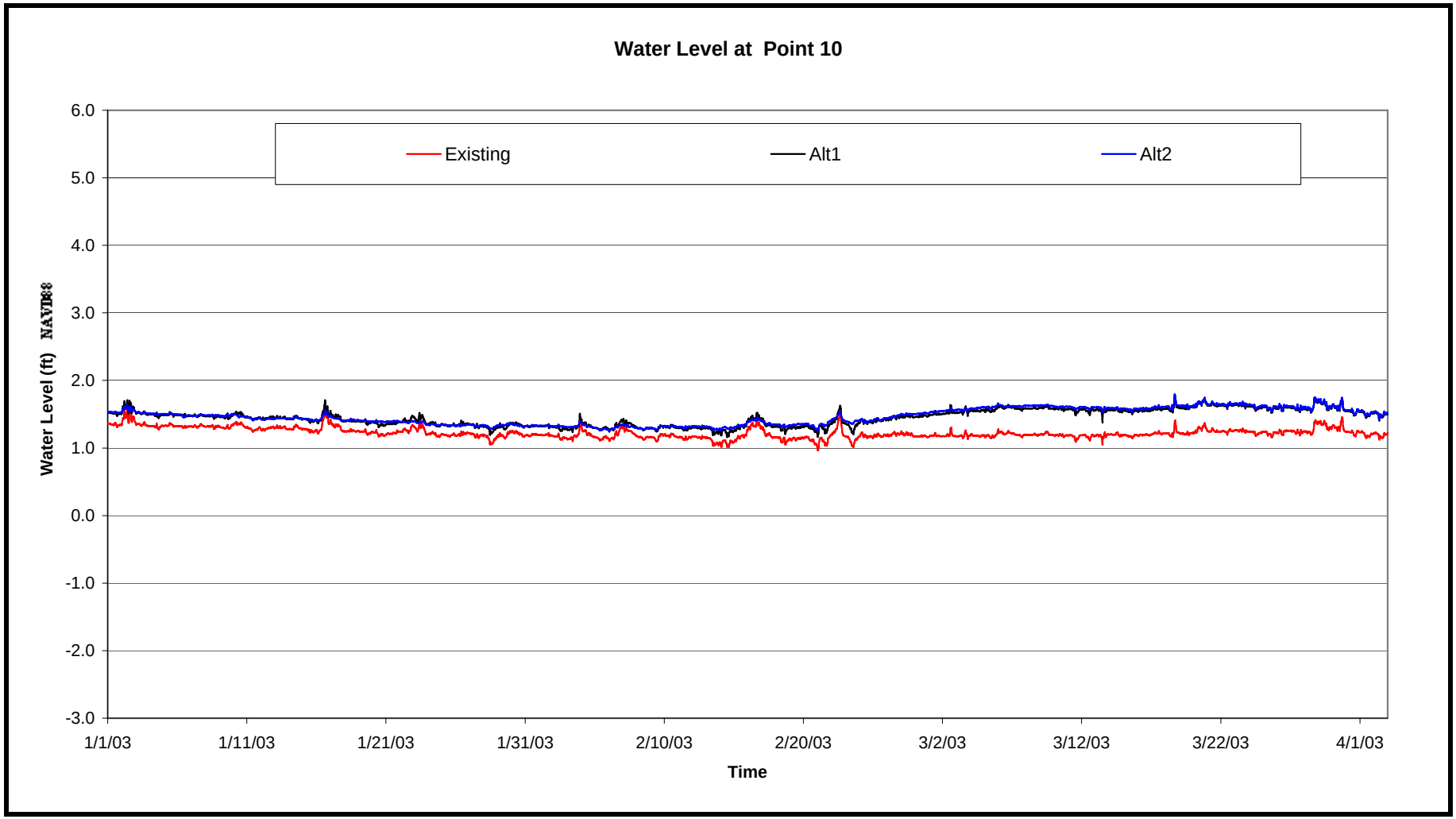


Figure A-57: Water Level Results At Point No.10

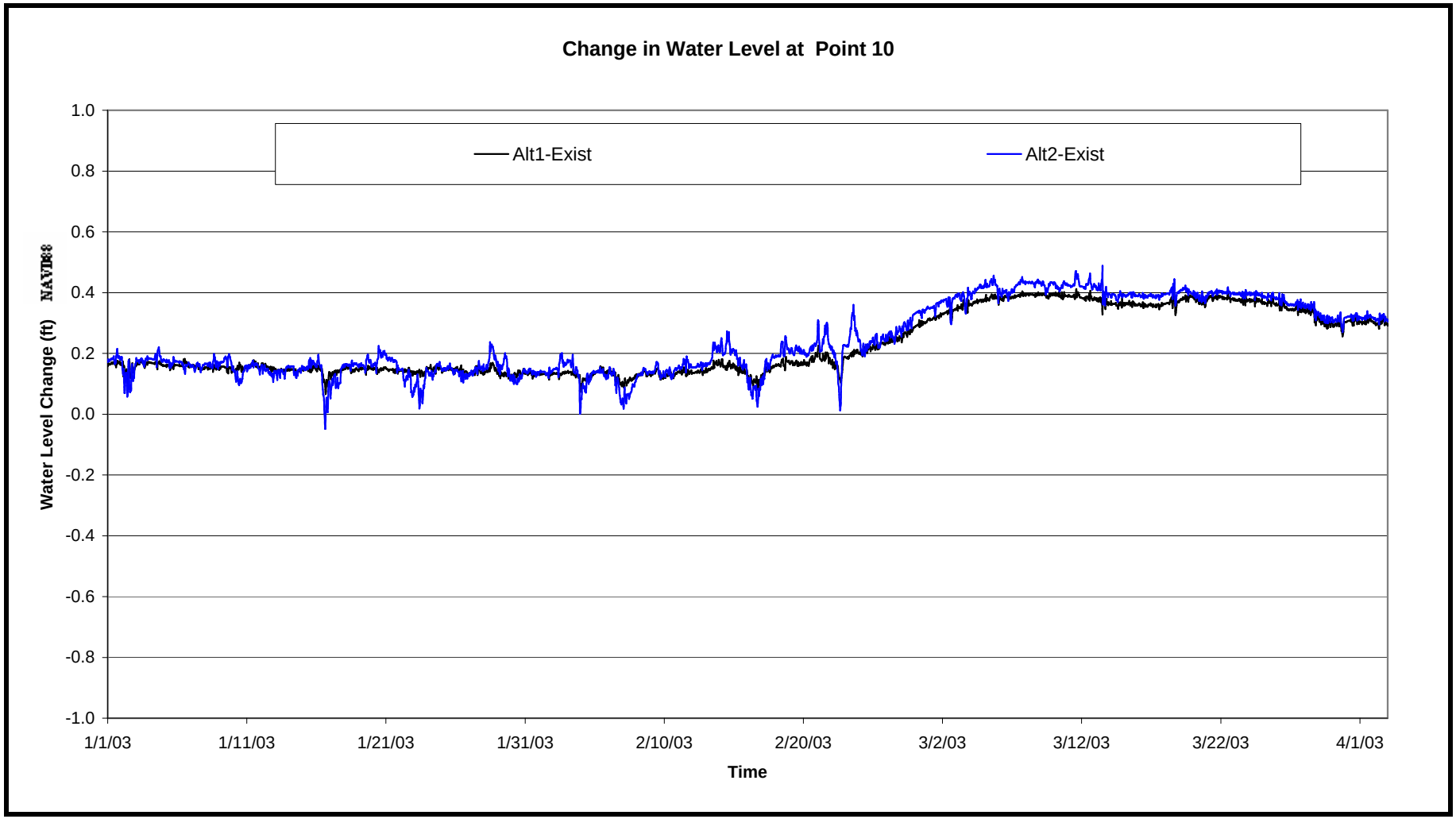


Figure A-58: Water Level Change Results At Point No.10

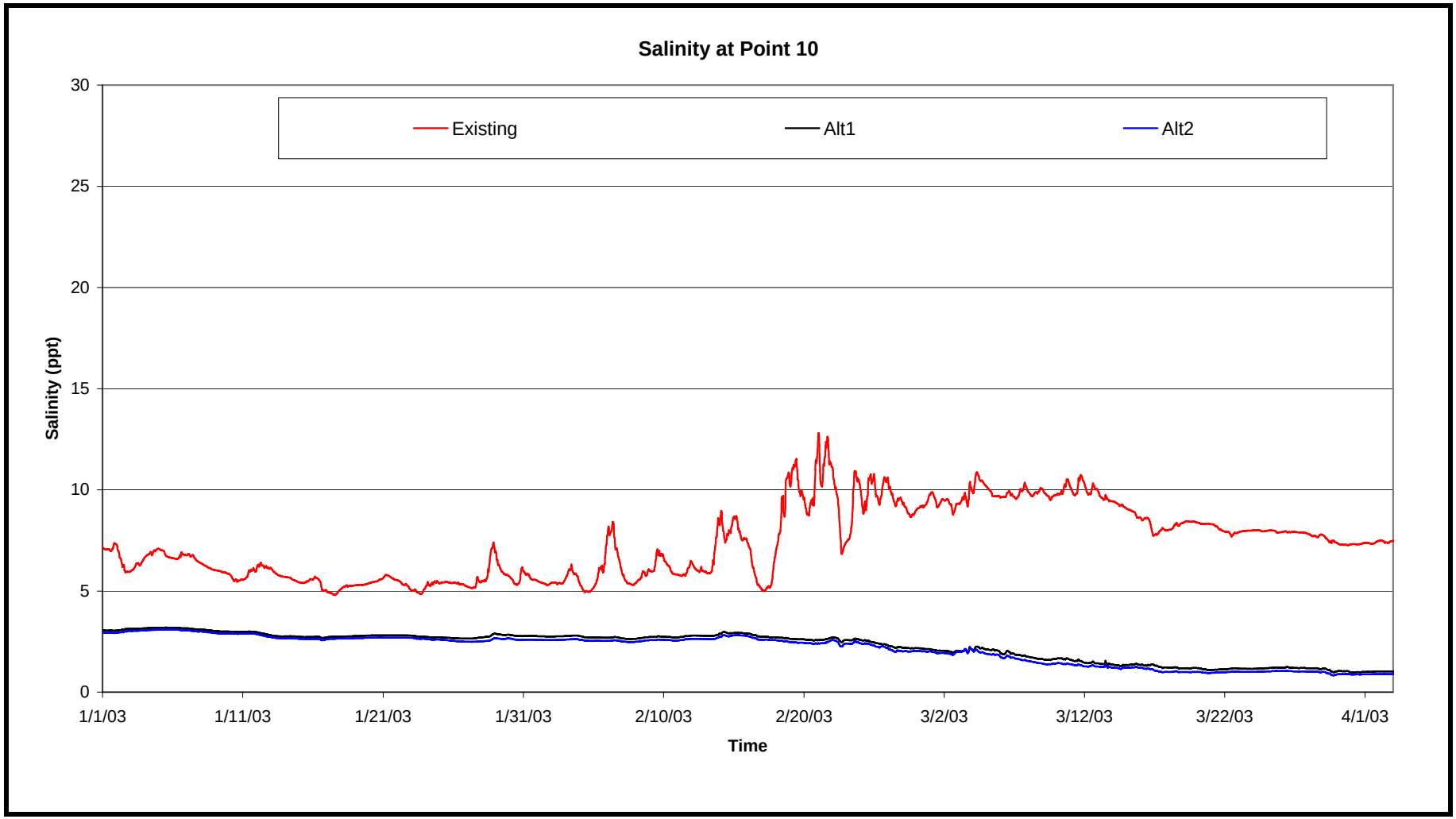


Figure A-59: Salinity Results At Point No.10

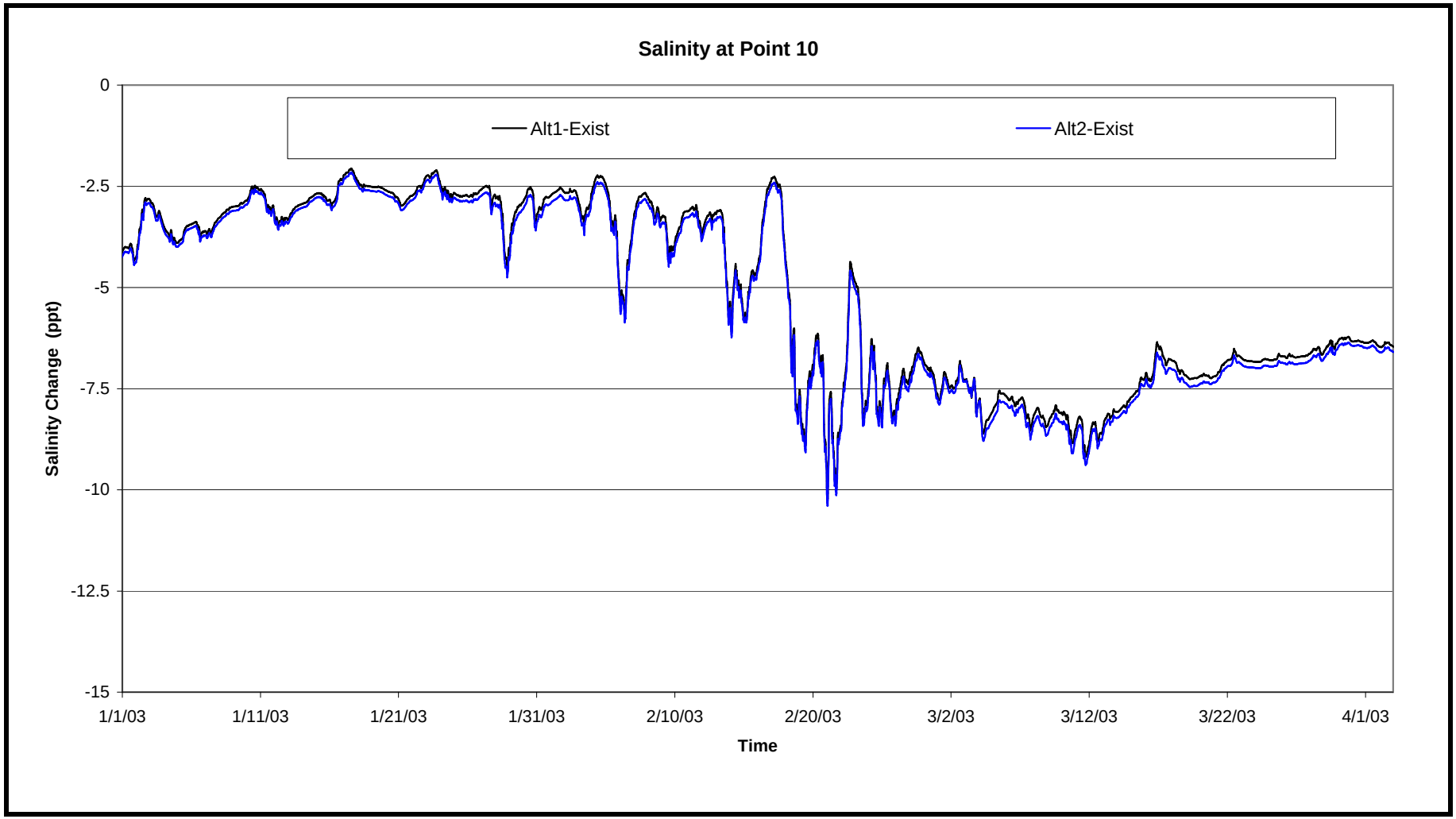


Figure A-60: Salinity Change Results At Point No.10

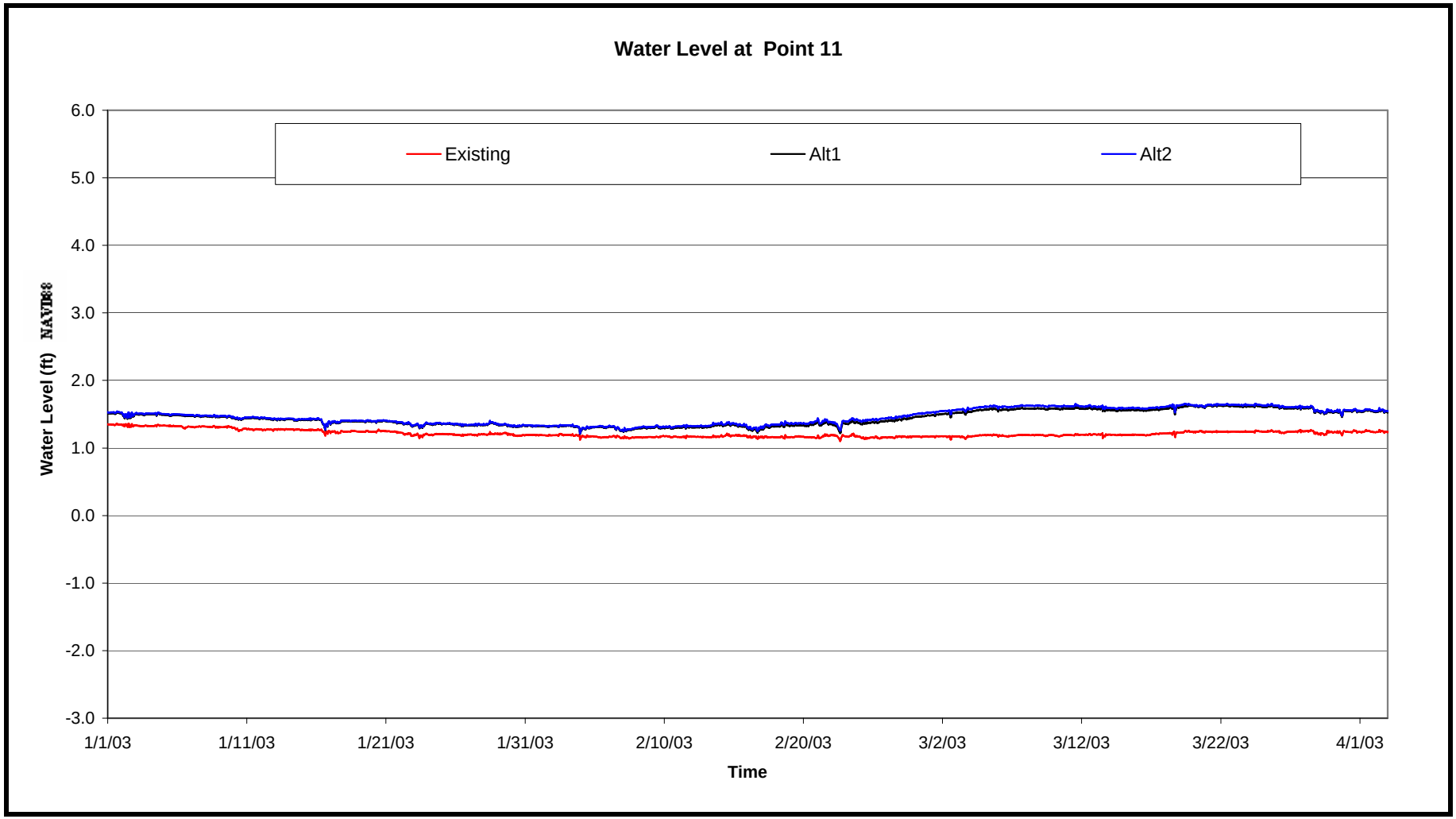


Figure A-61: Water Level Results At Point No.11

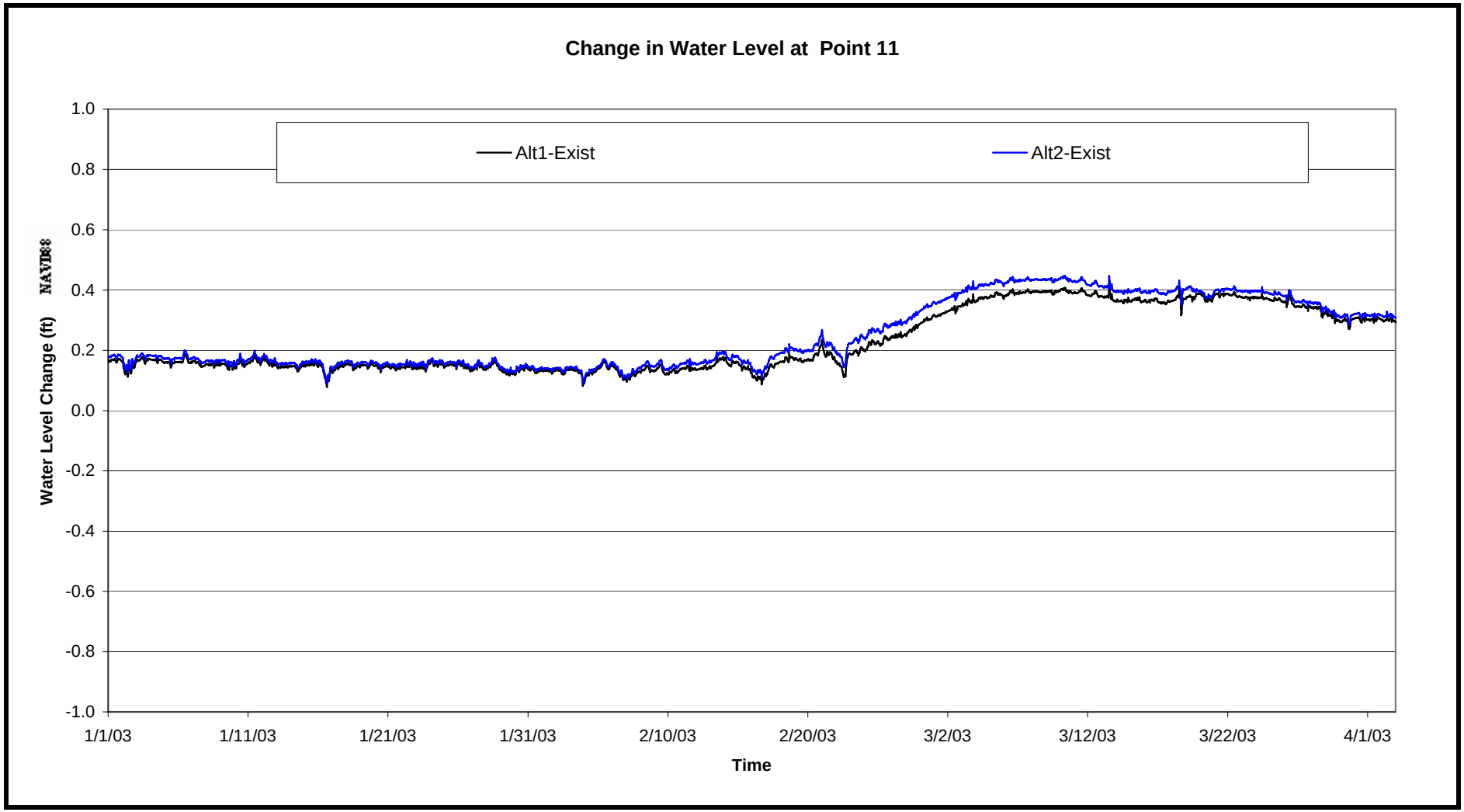


Figure A-62: Water Level Change Results At Point No.11

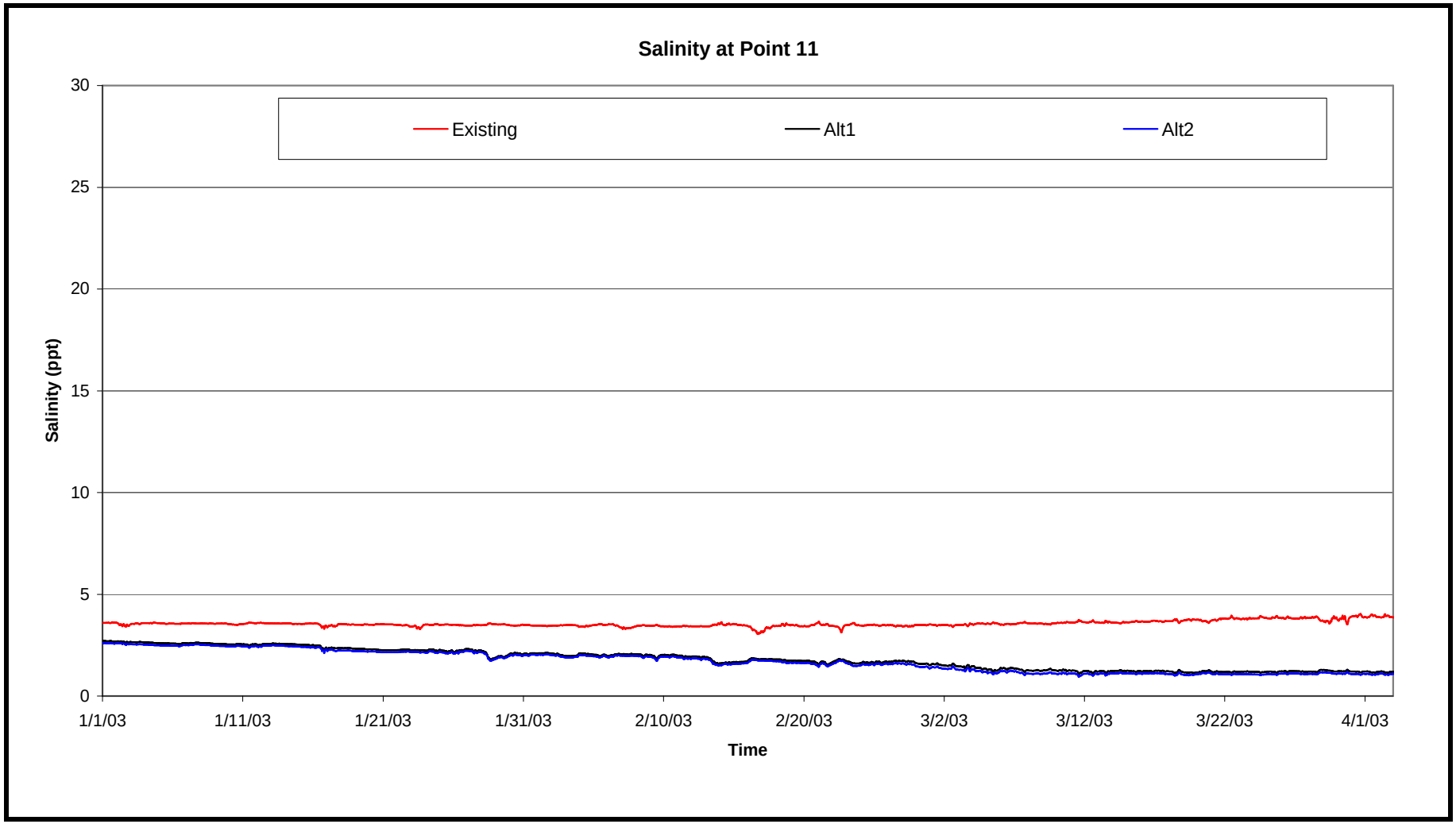


Figure A-63: Salinity Results At Point No.11

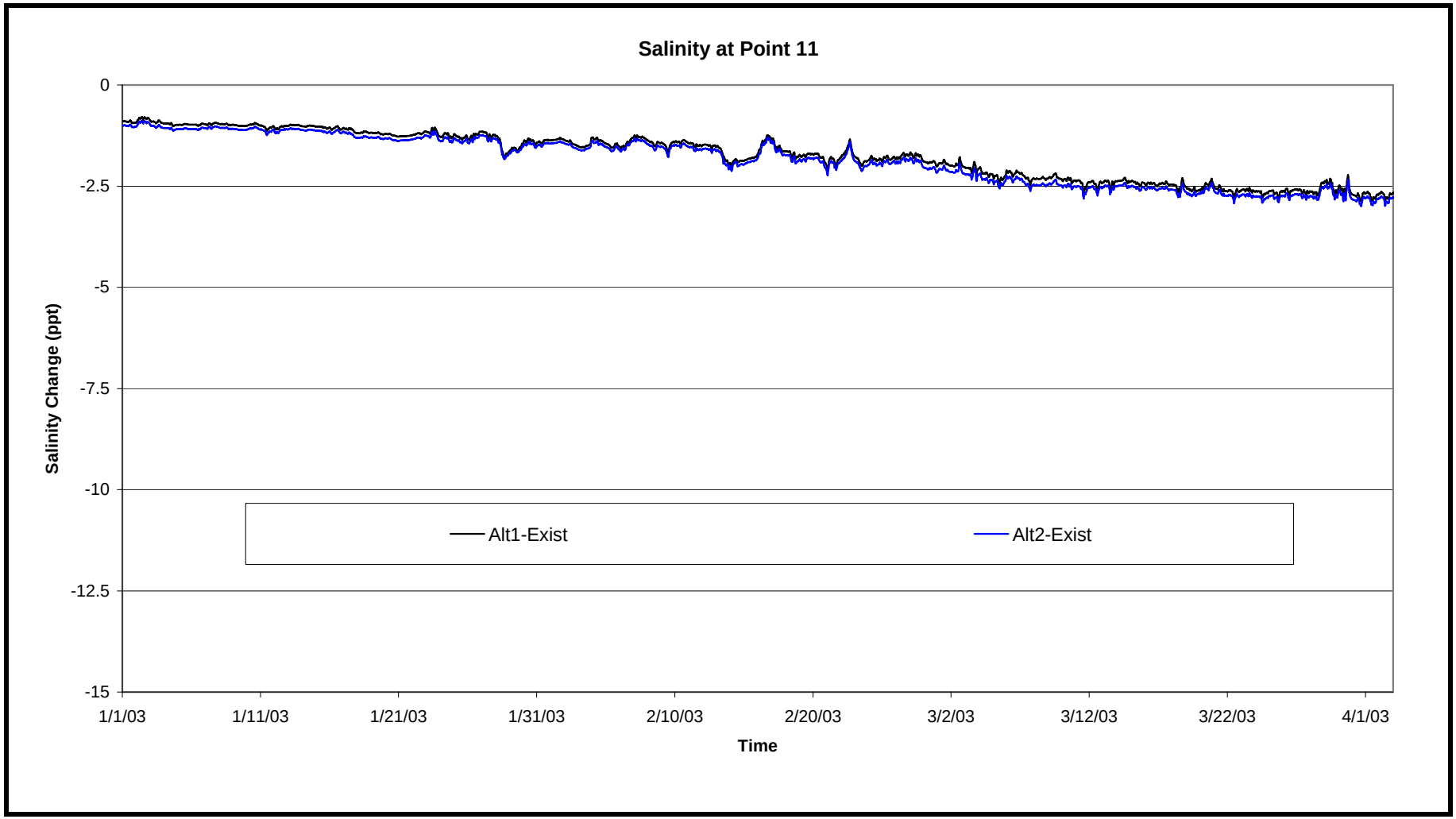


Figure A-64: Salinity Change Results At Point No.11

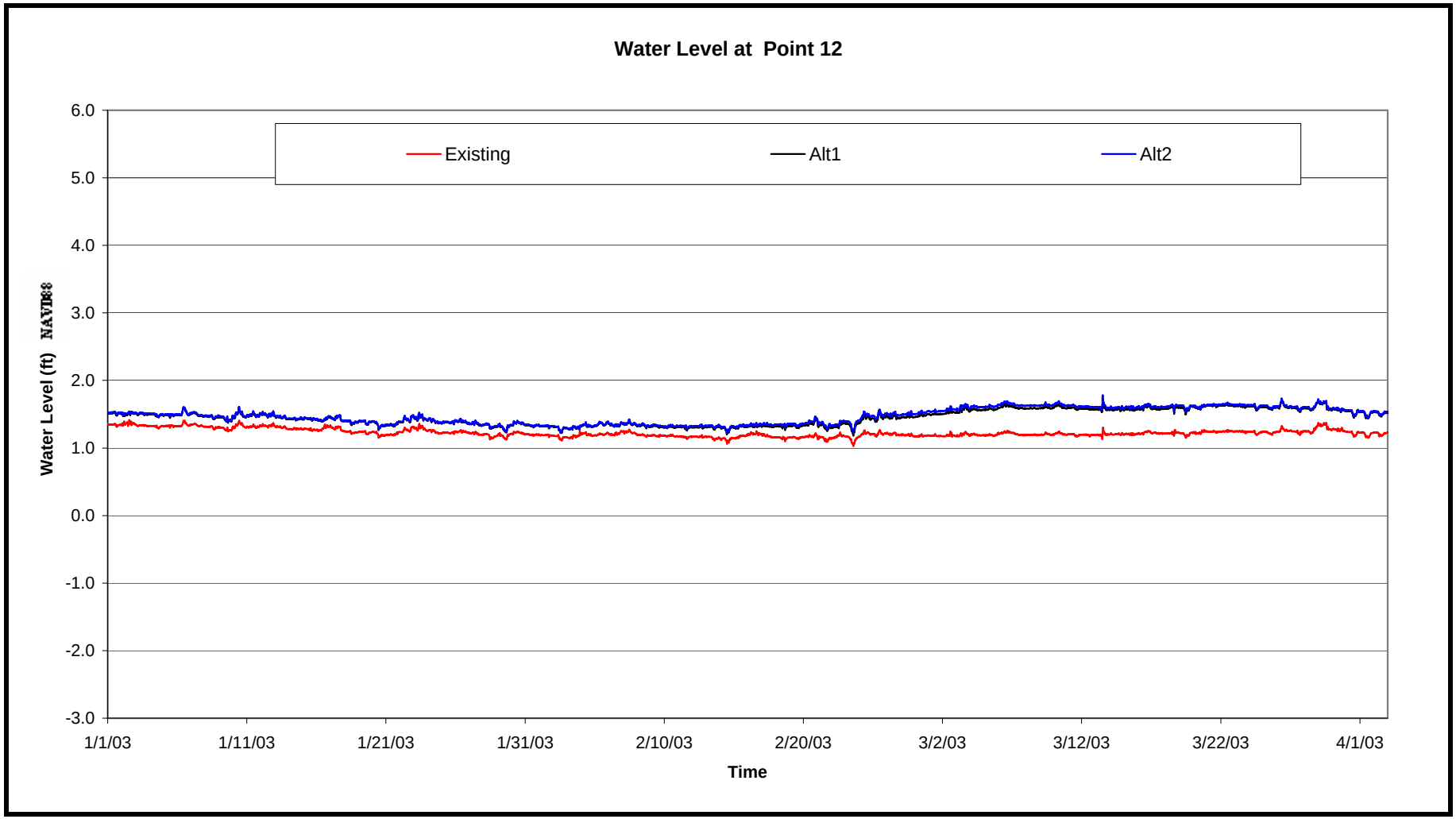


Figure A-65: Water Level Results At Point No.12

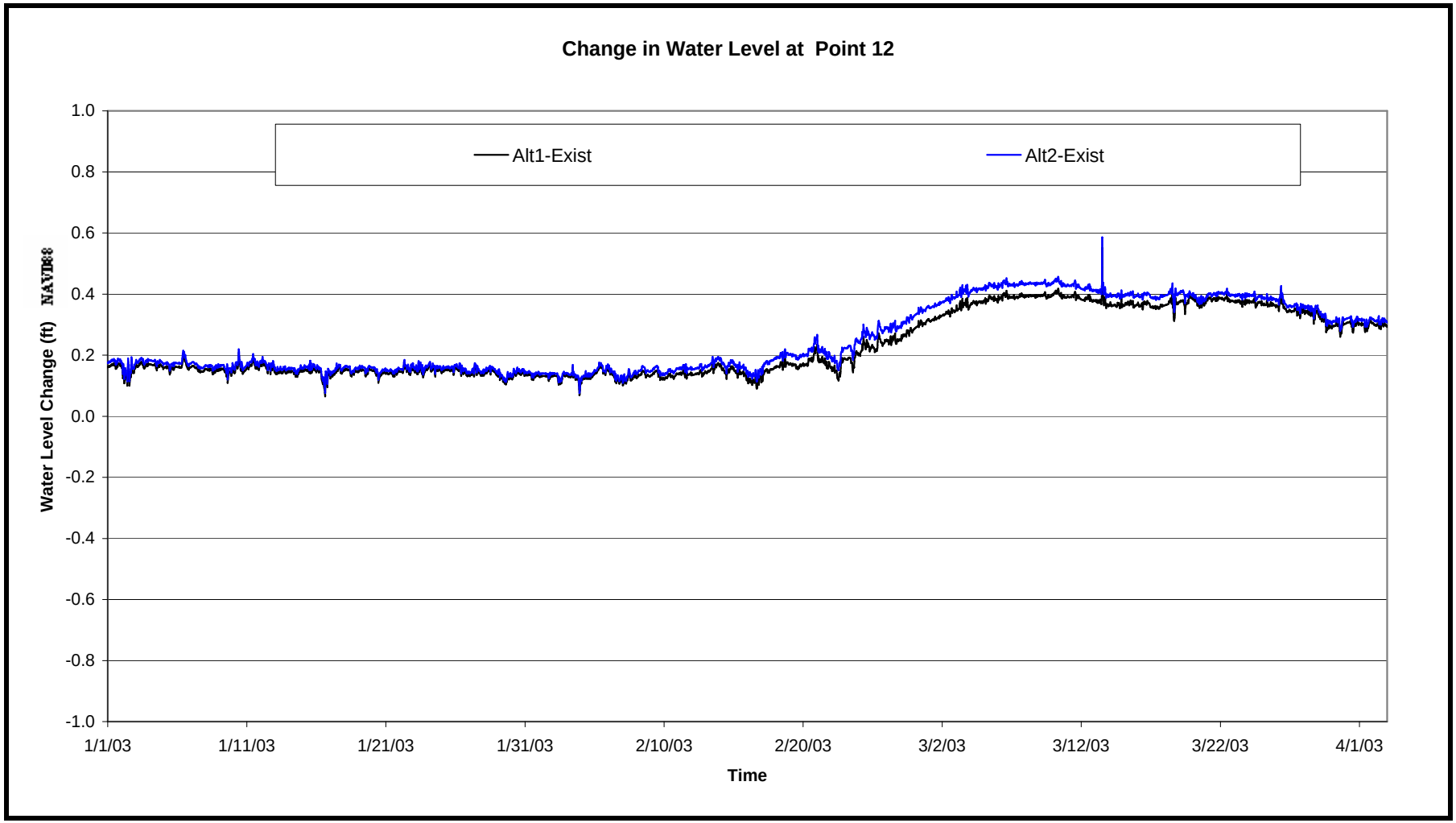


Figure A-66: Water Level Change Results At Point No.12

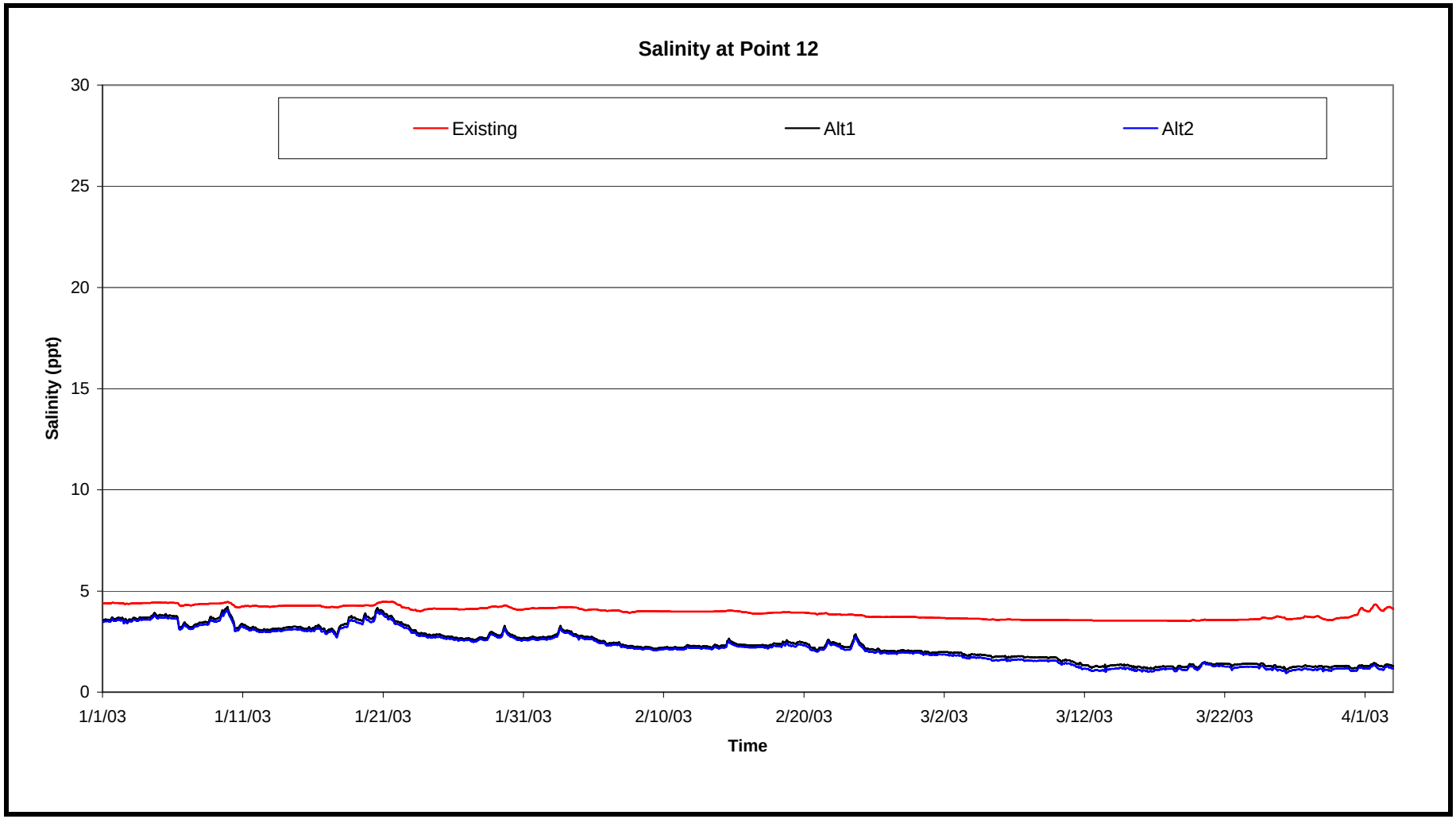


Figure A-67: Salinity Results At Point No.12

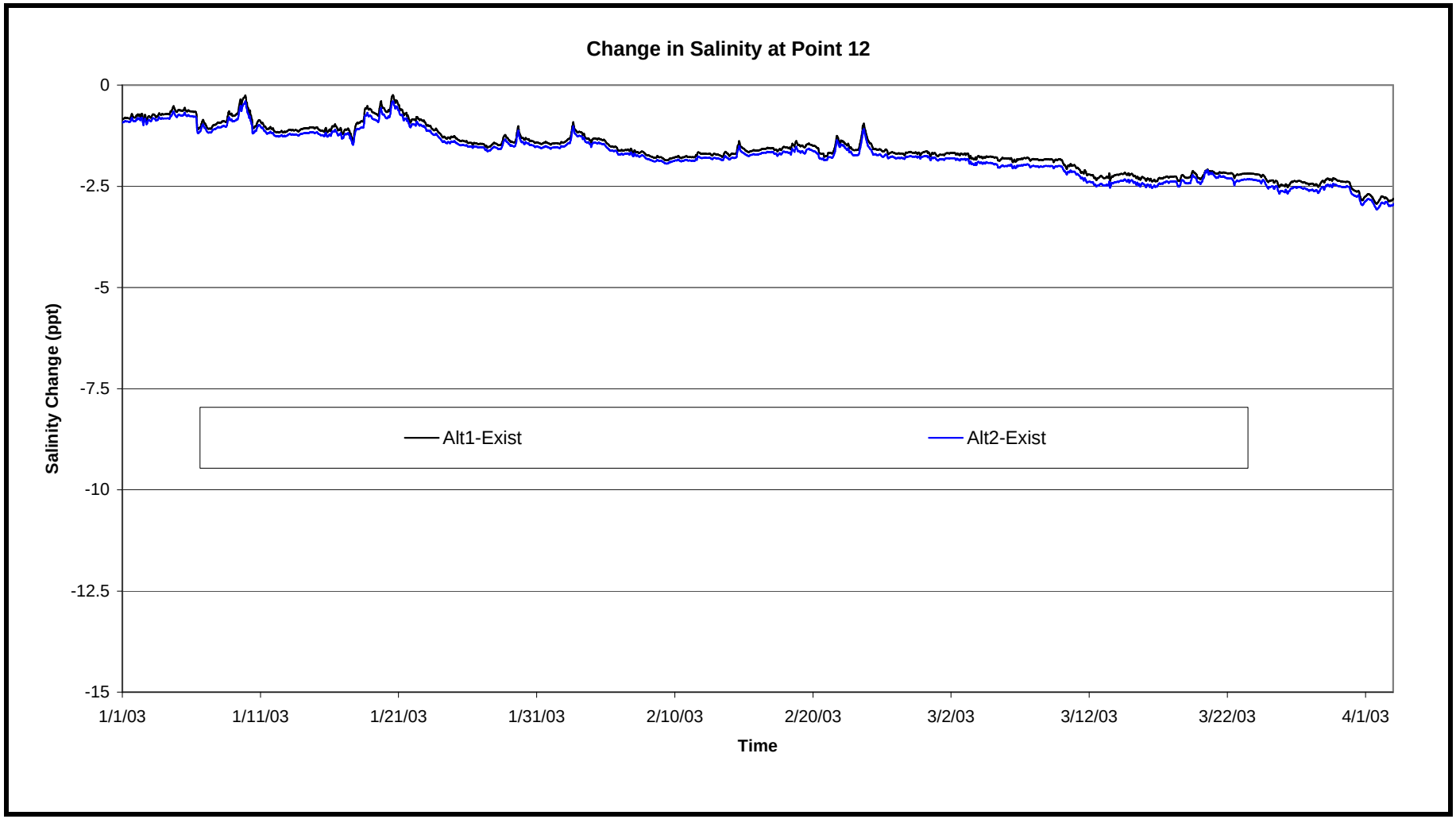
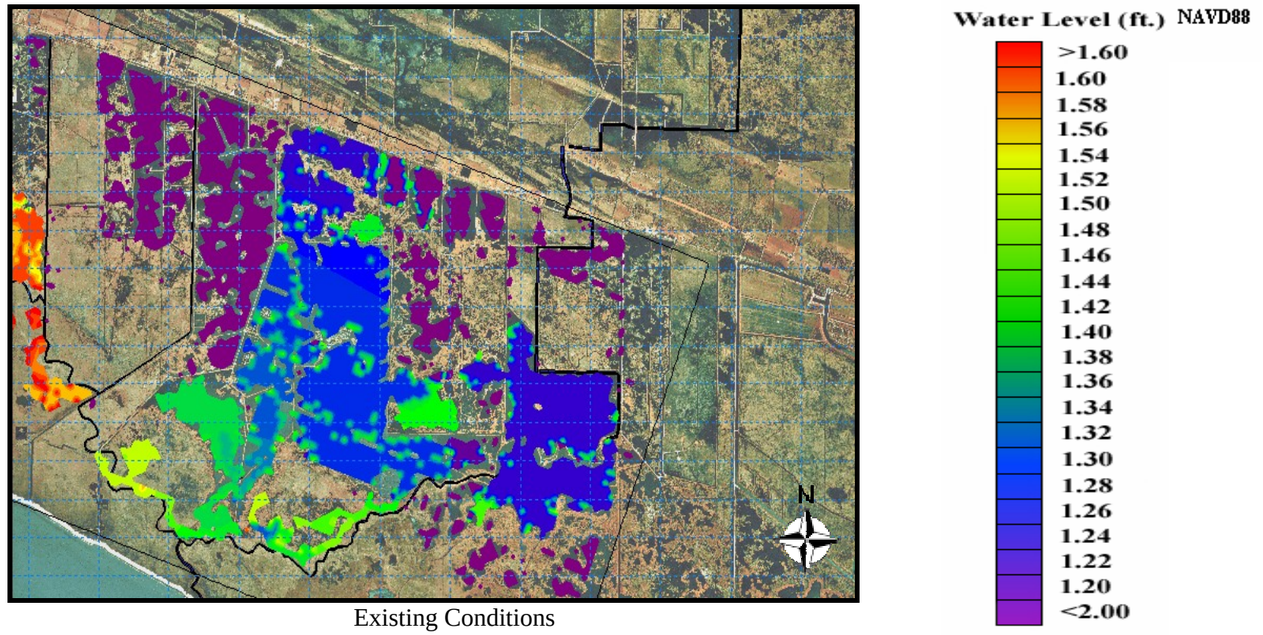
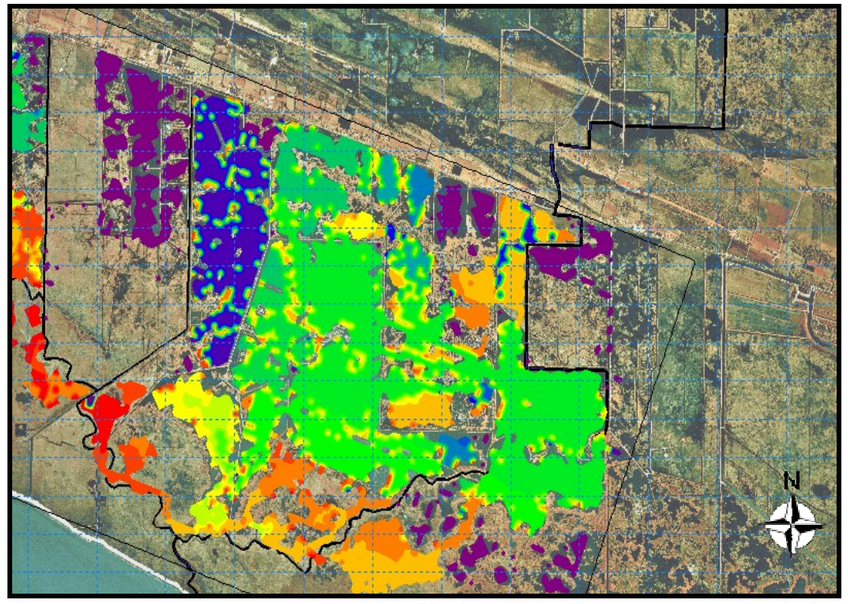


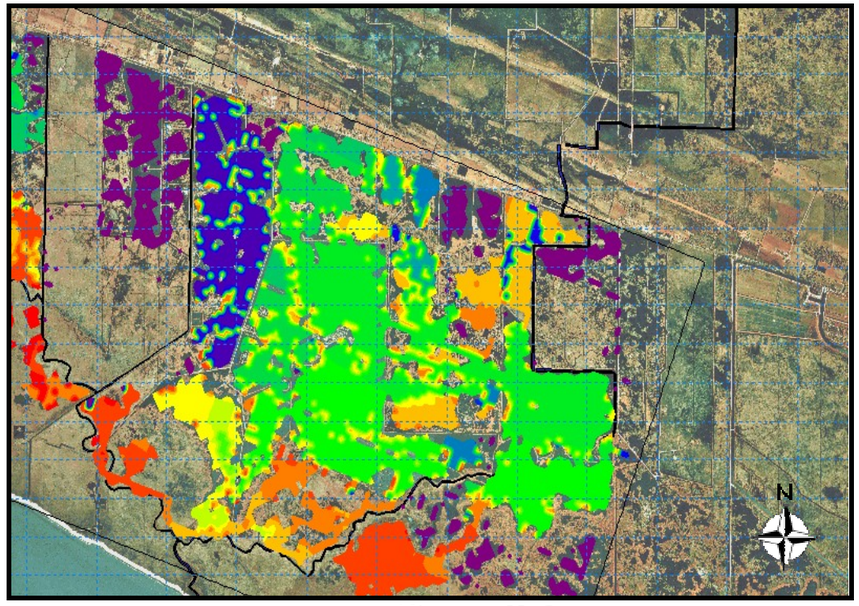
Figure A-68: Salinity Change Results At Point No.12



Existing Conditions

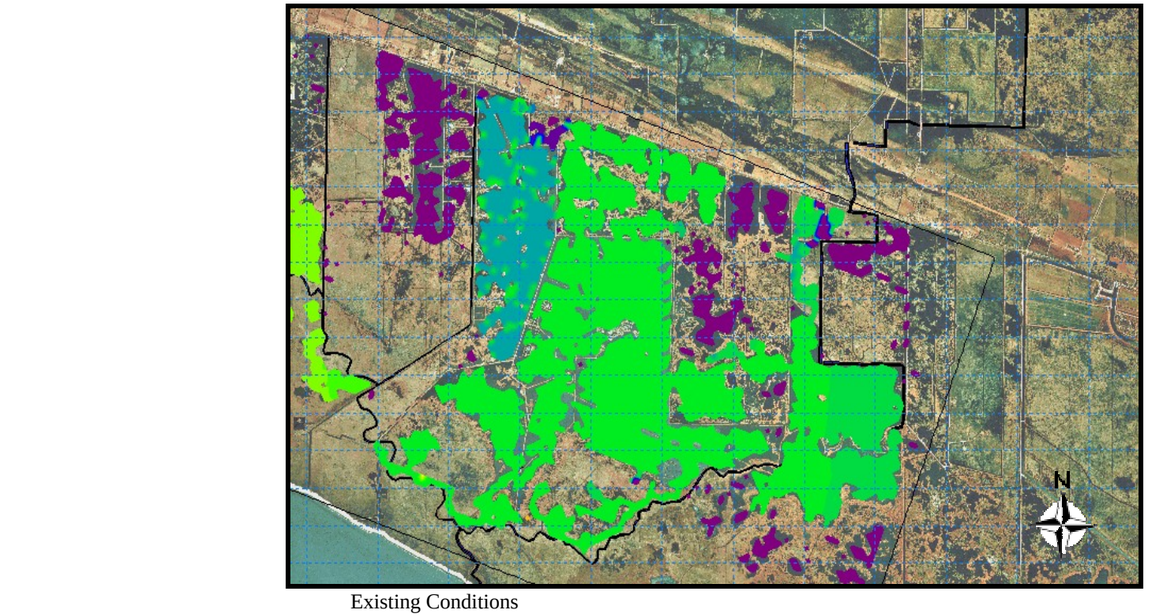


Alignment No.1

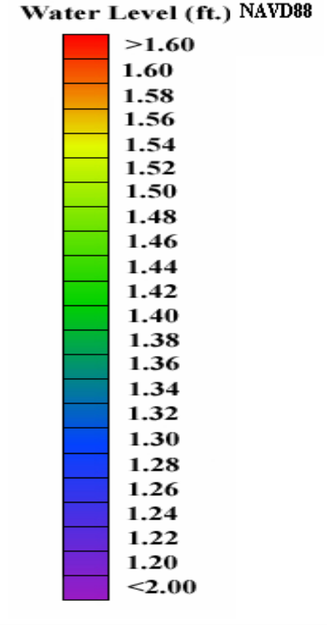


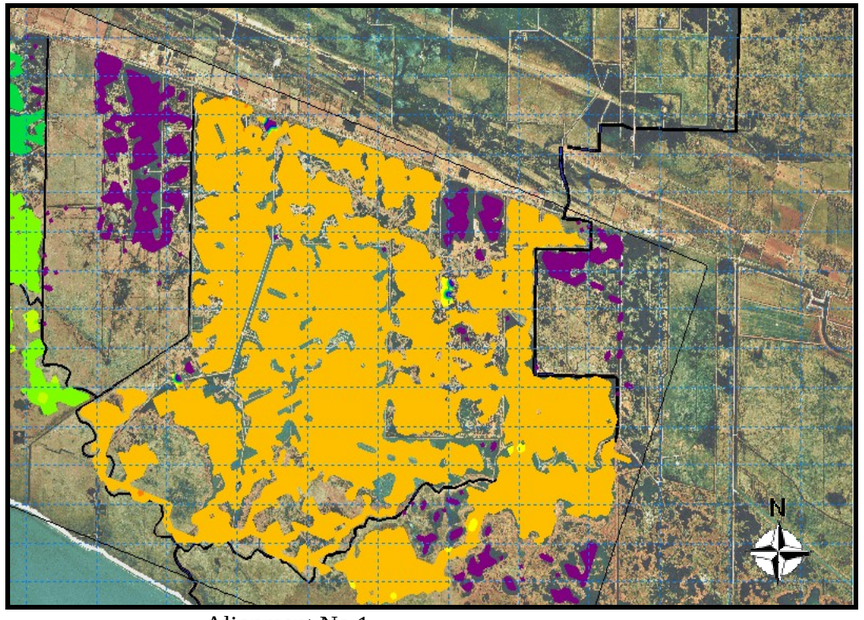
Alignment No.2

Figure A-69: Month Of November 2002 Average Water Level Contour Maps

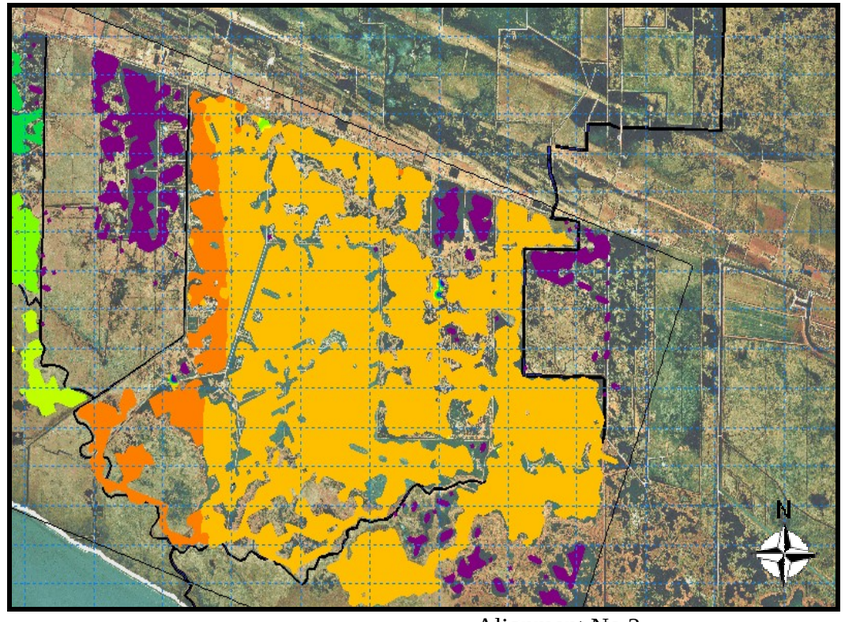


Existing Conditions



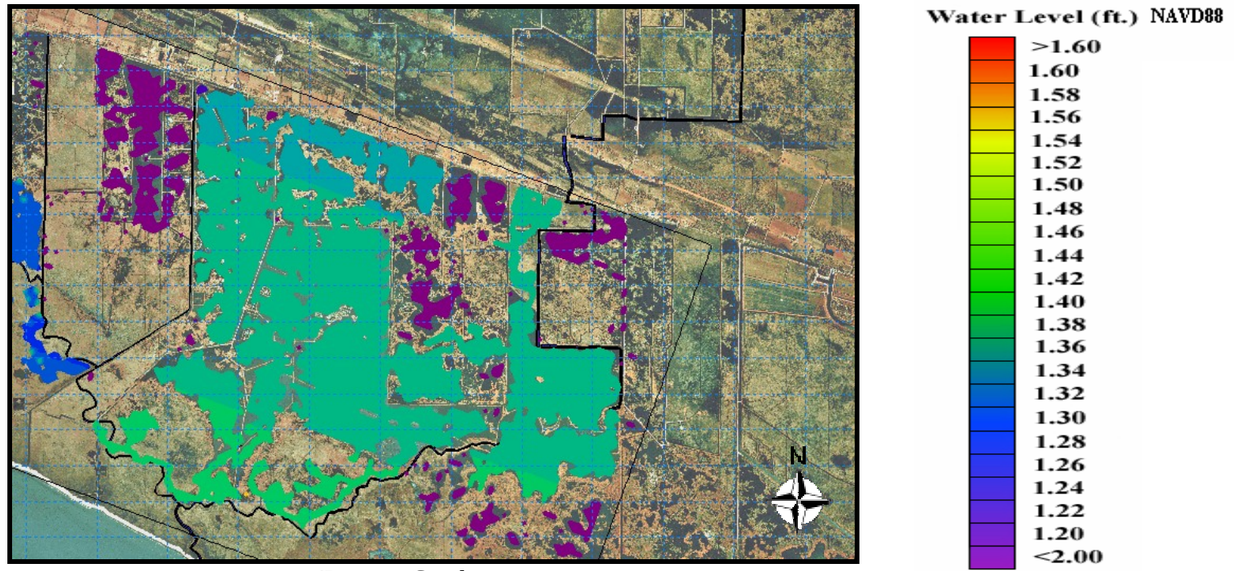


Alignment No.1

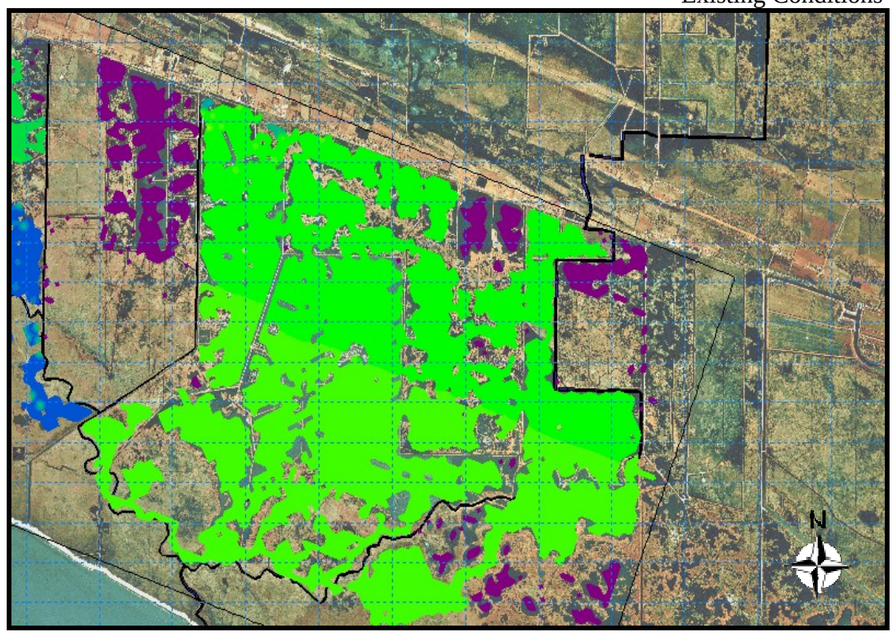


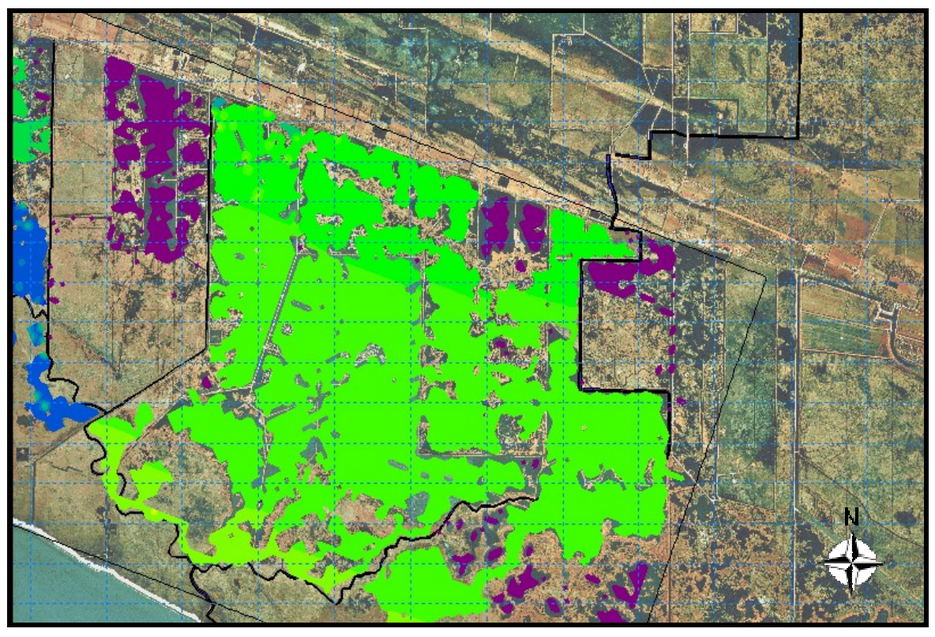
Alignment No.2

Figure A-70: Month Of December 2002 Average Water Level Contour Maps



Existing Conditions

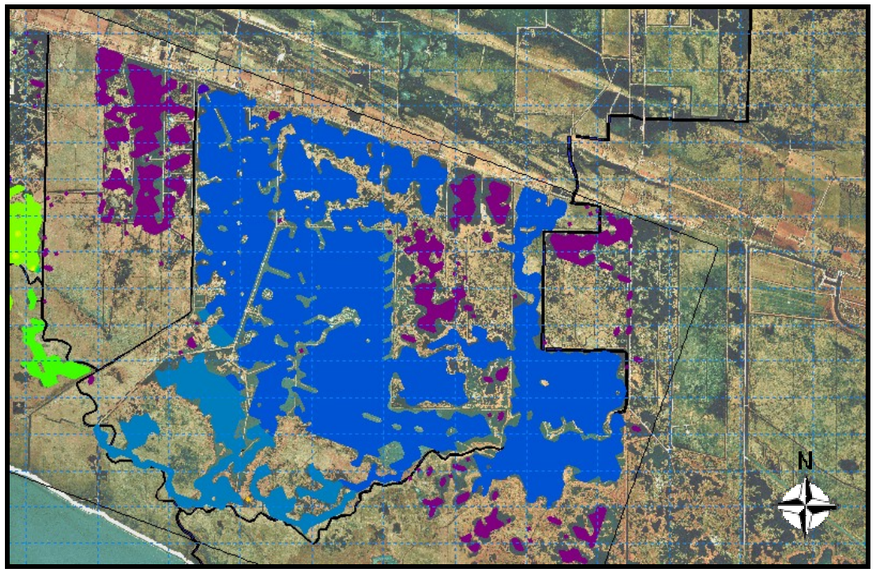




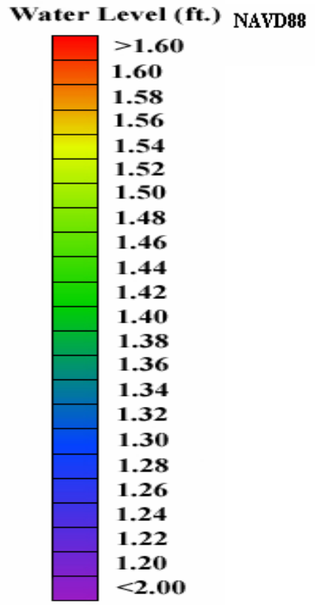
Alignment No.1

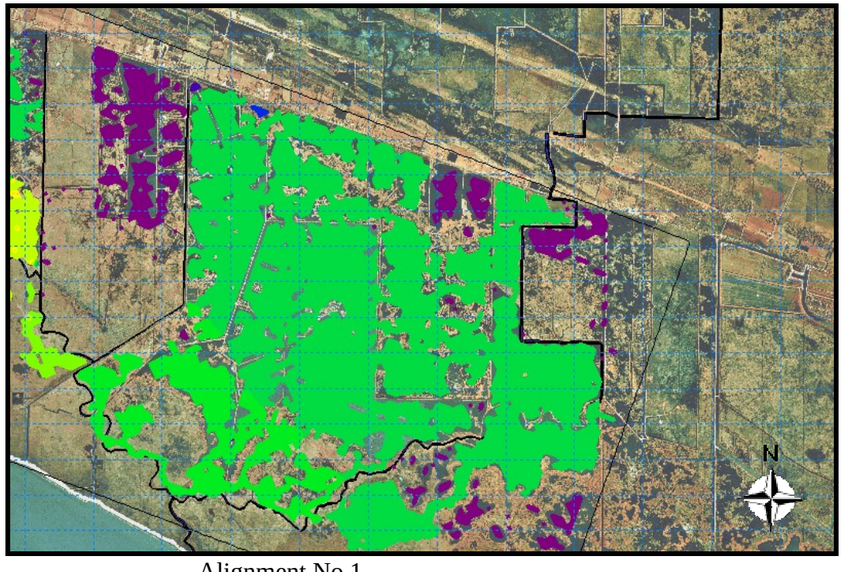
Alignment No.2

Figure A-71: Month Of January 2003 Average Water Level Contour Maps

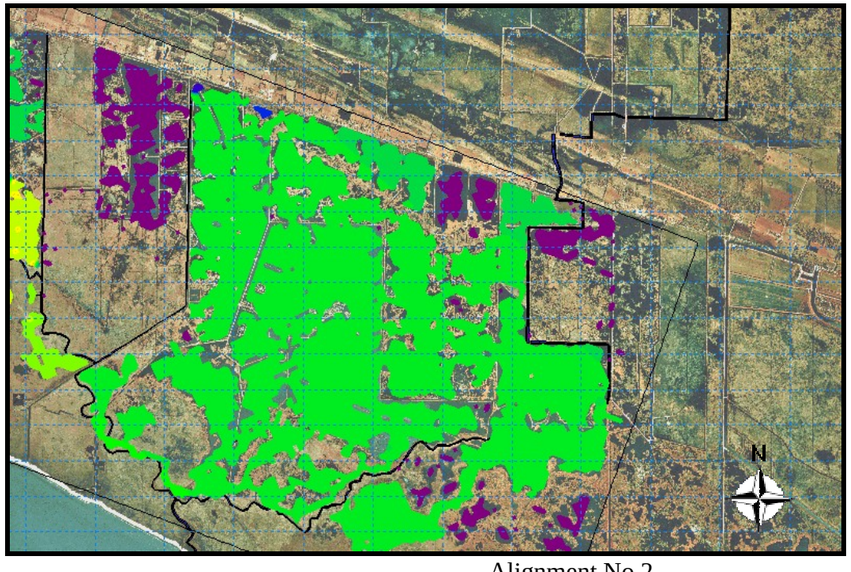


Existing Conditions



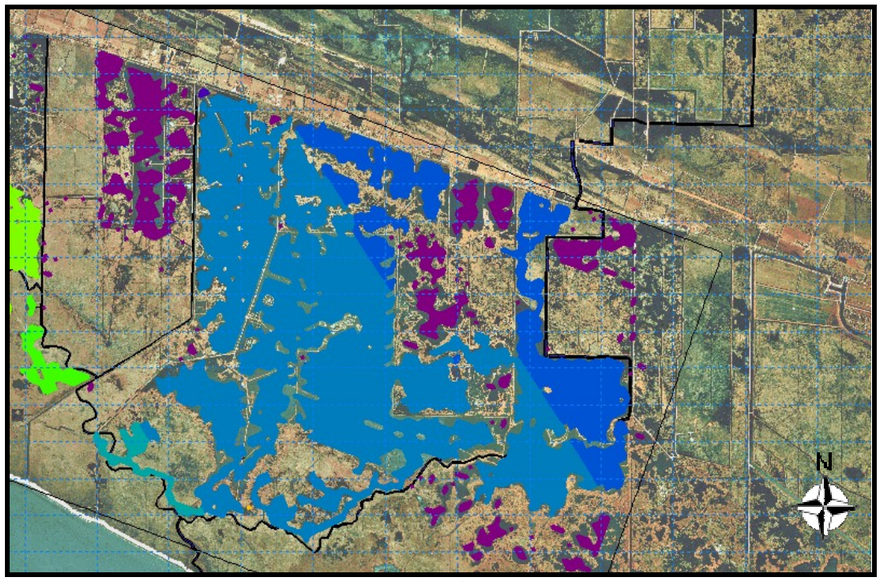


Alignment No.1

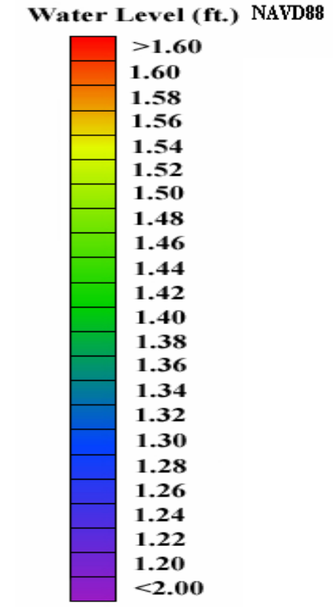


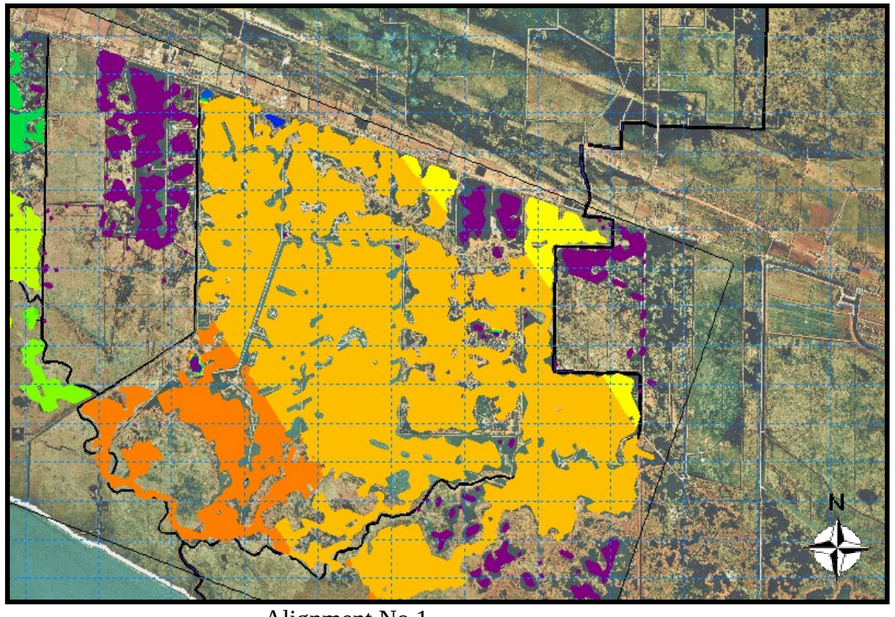
Alignment No.2

Figure A-72: Month Of February 2003 Average Water Level Contour Maps

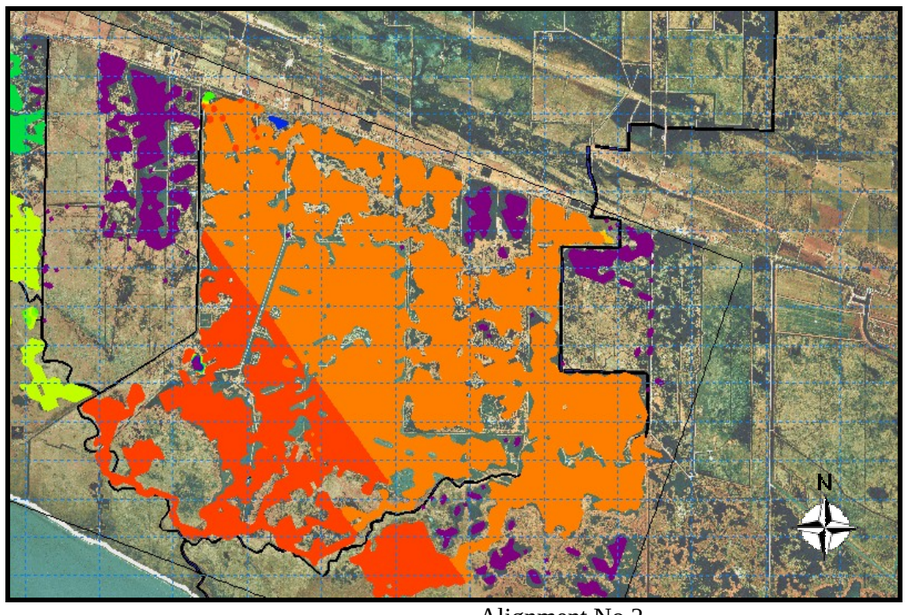


Existing Conditions





Alignment No.1



Alignment No.2

Figure A-73: Month Of March 2003 Average Water Level Contour Maps

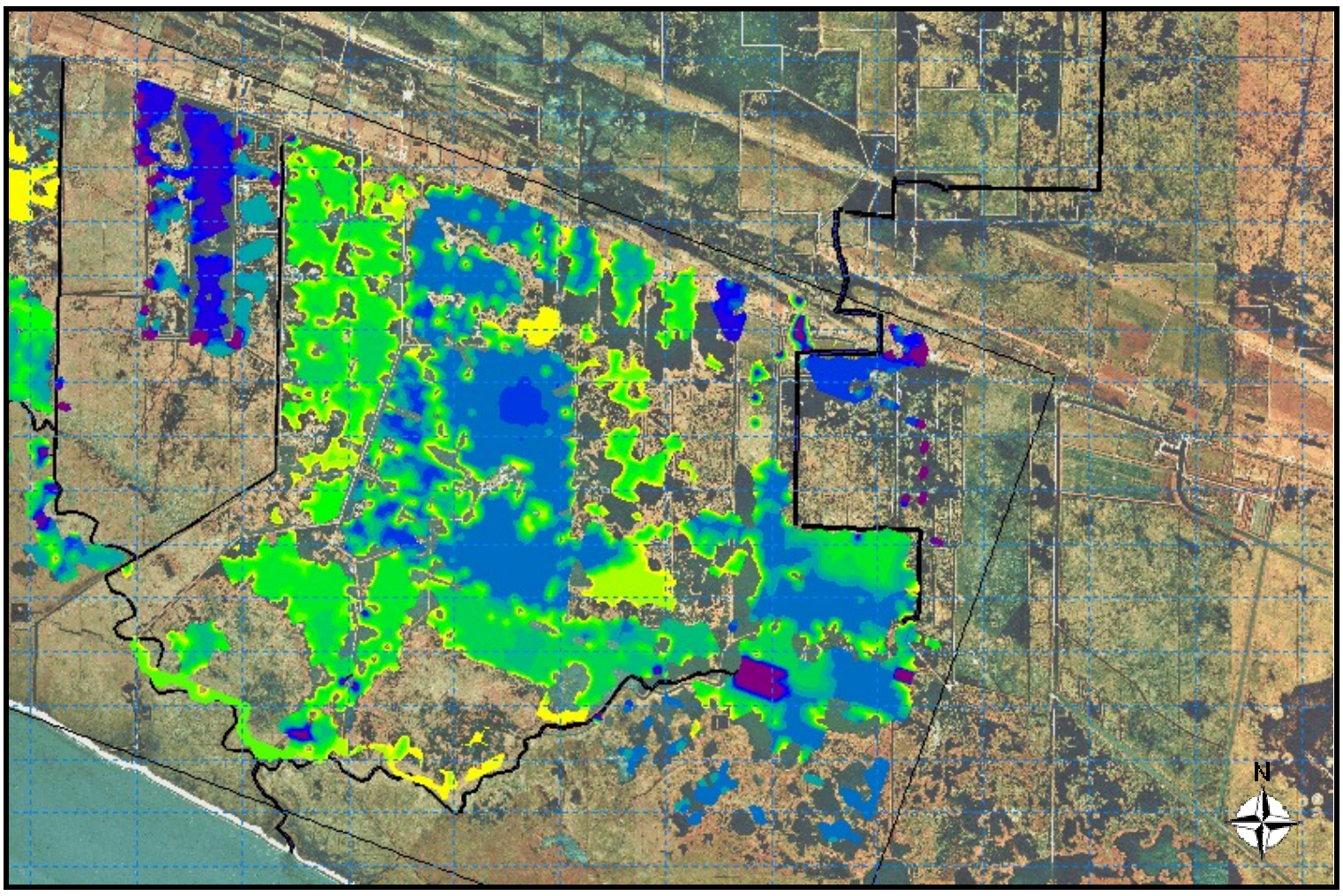


Figure A-74: Month Of November 2002 Average Water Level Change Contour Maps (Alignment No.1 – Existing Conditions)

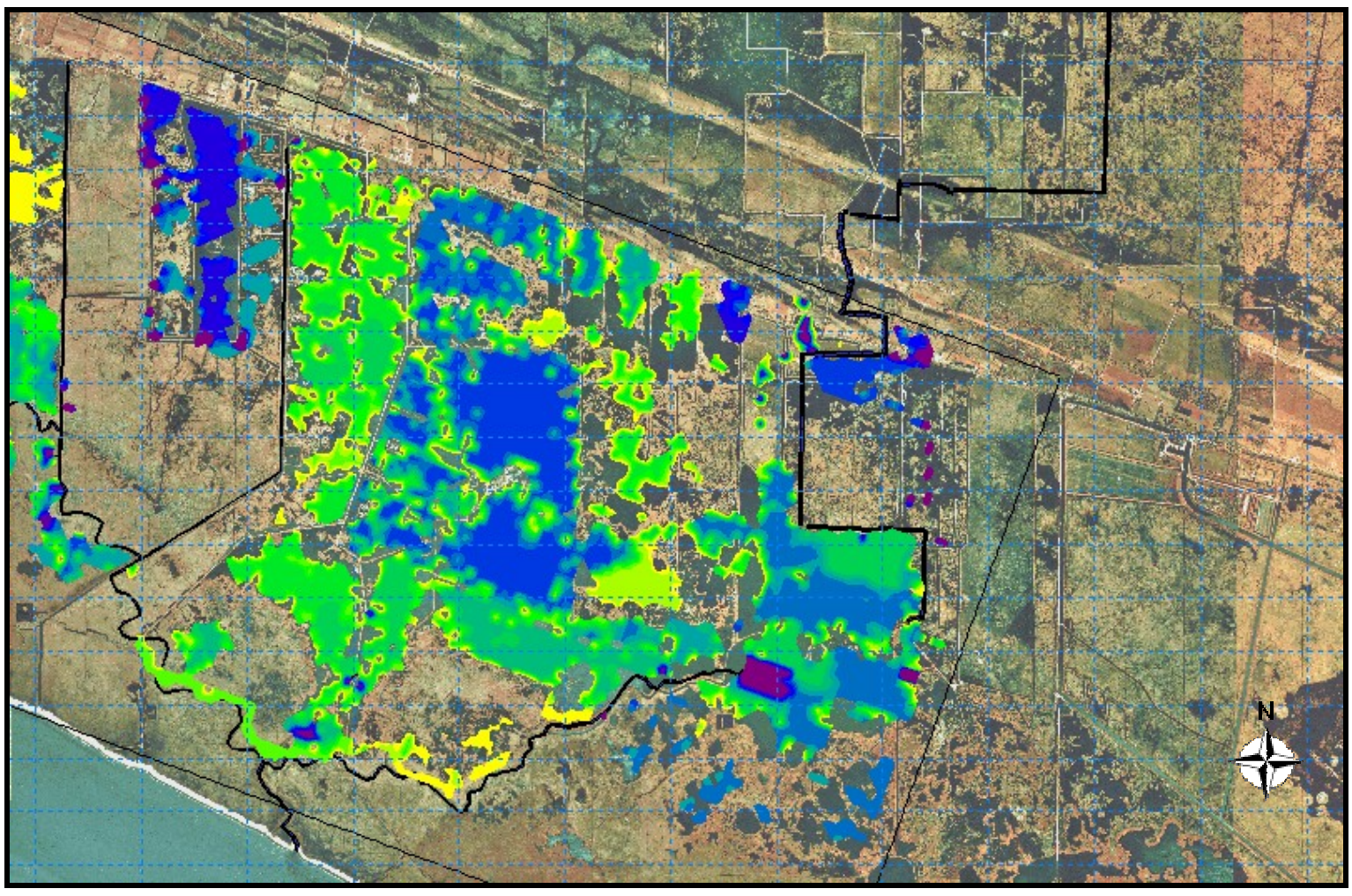
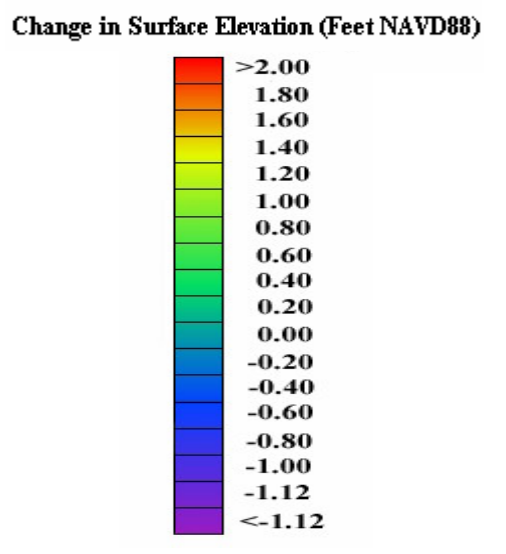


Figure A-75: Month Of November 2002 Average Water Level Change Contour Maps (Alignment No.2 – Existing Conditions)



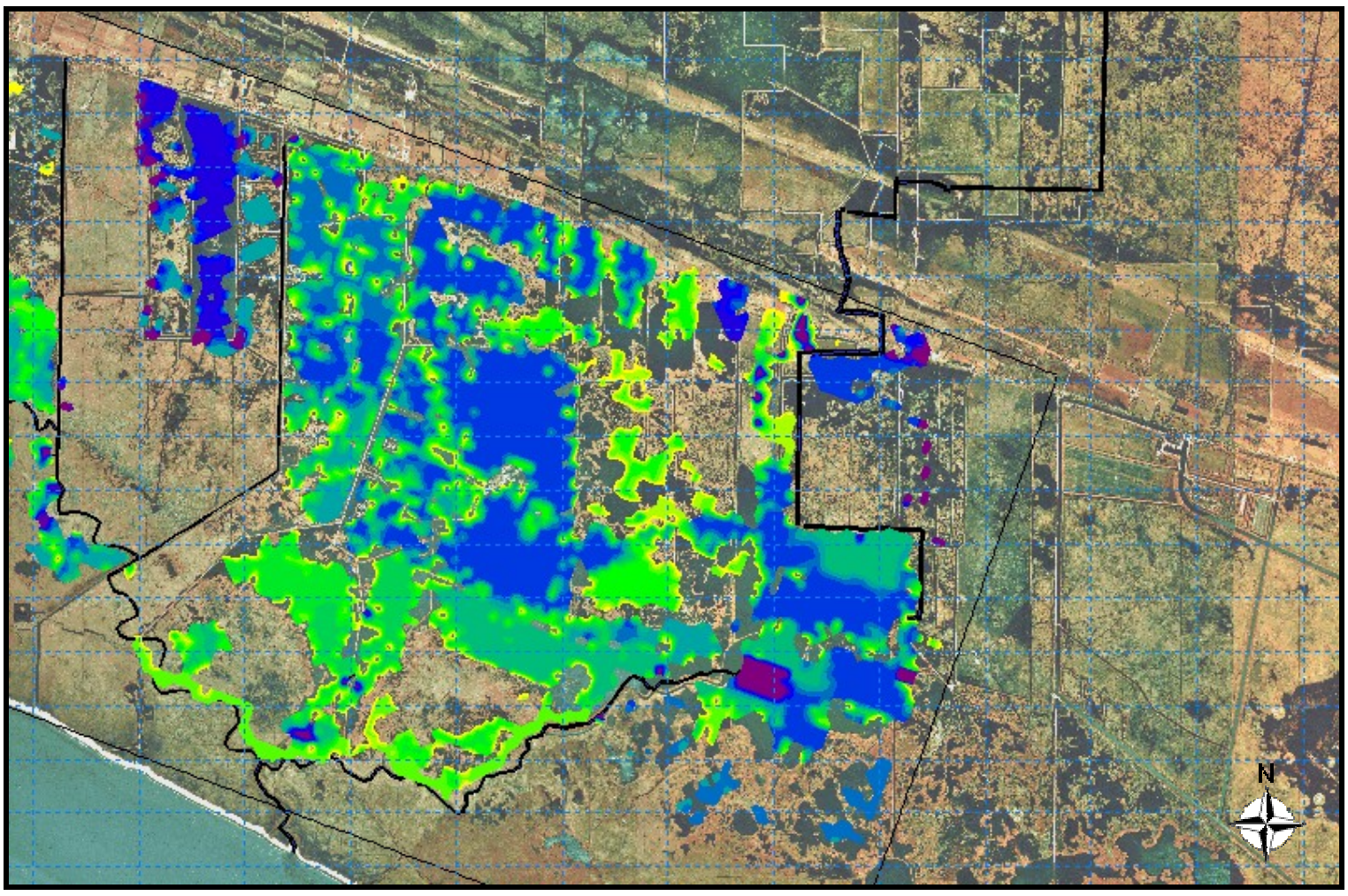


Figure A-76: Month Of December 2002 Average Water Level Change Contour Maps (Alignment No.1 – Existing Conditions)

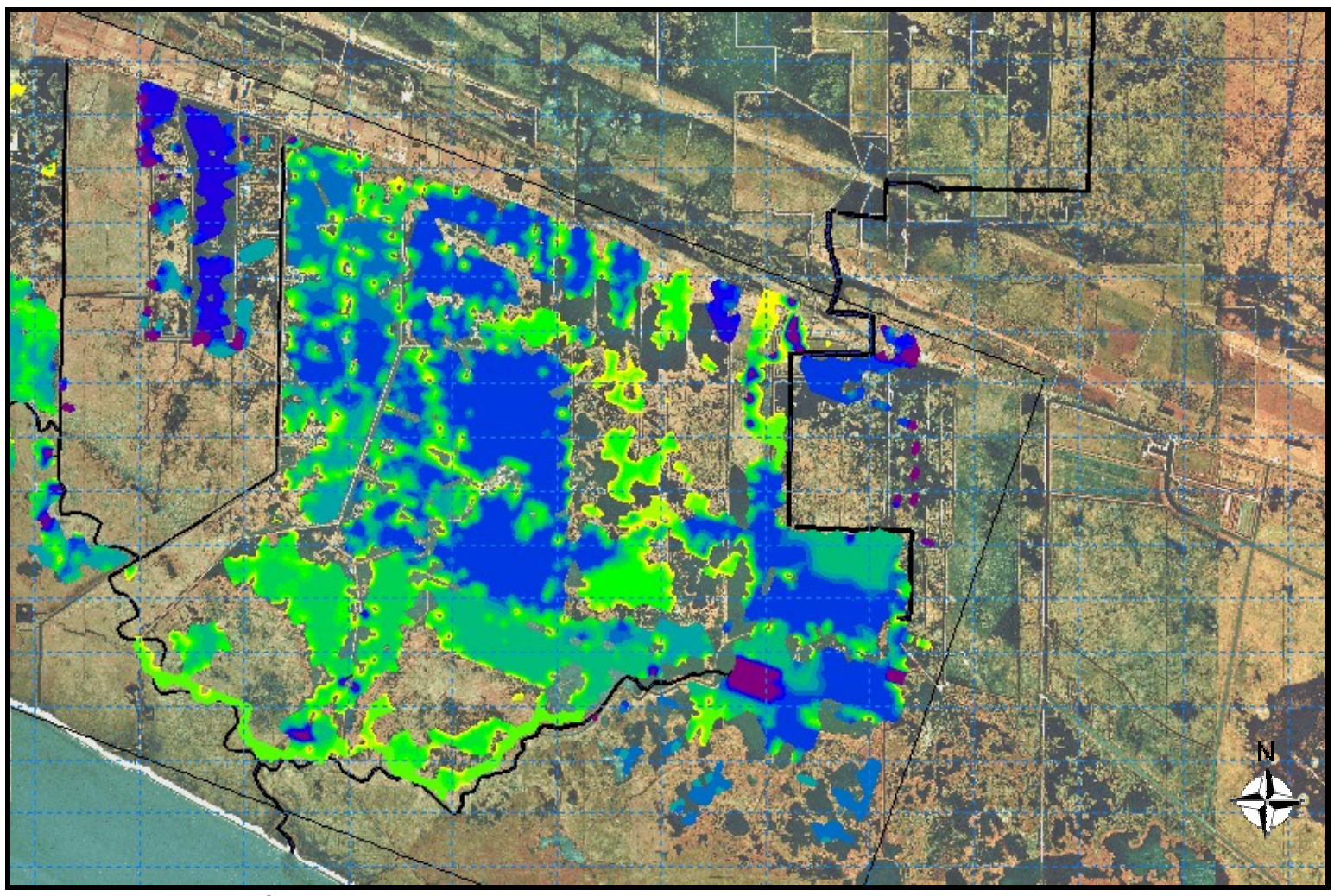
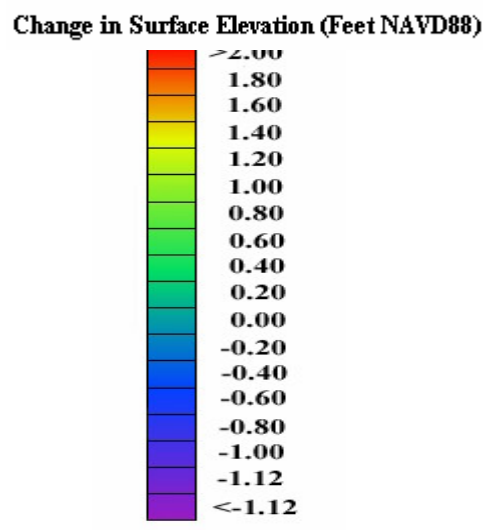


Figure A-77: Month Of December 2002 Average Water Level Change Contour Maps (Alignment No.2 – Existing Conditions)



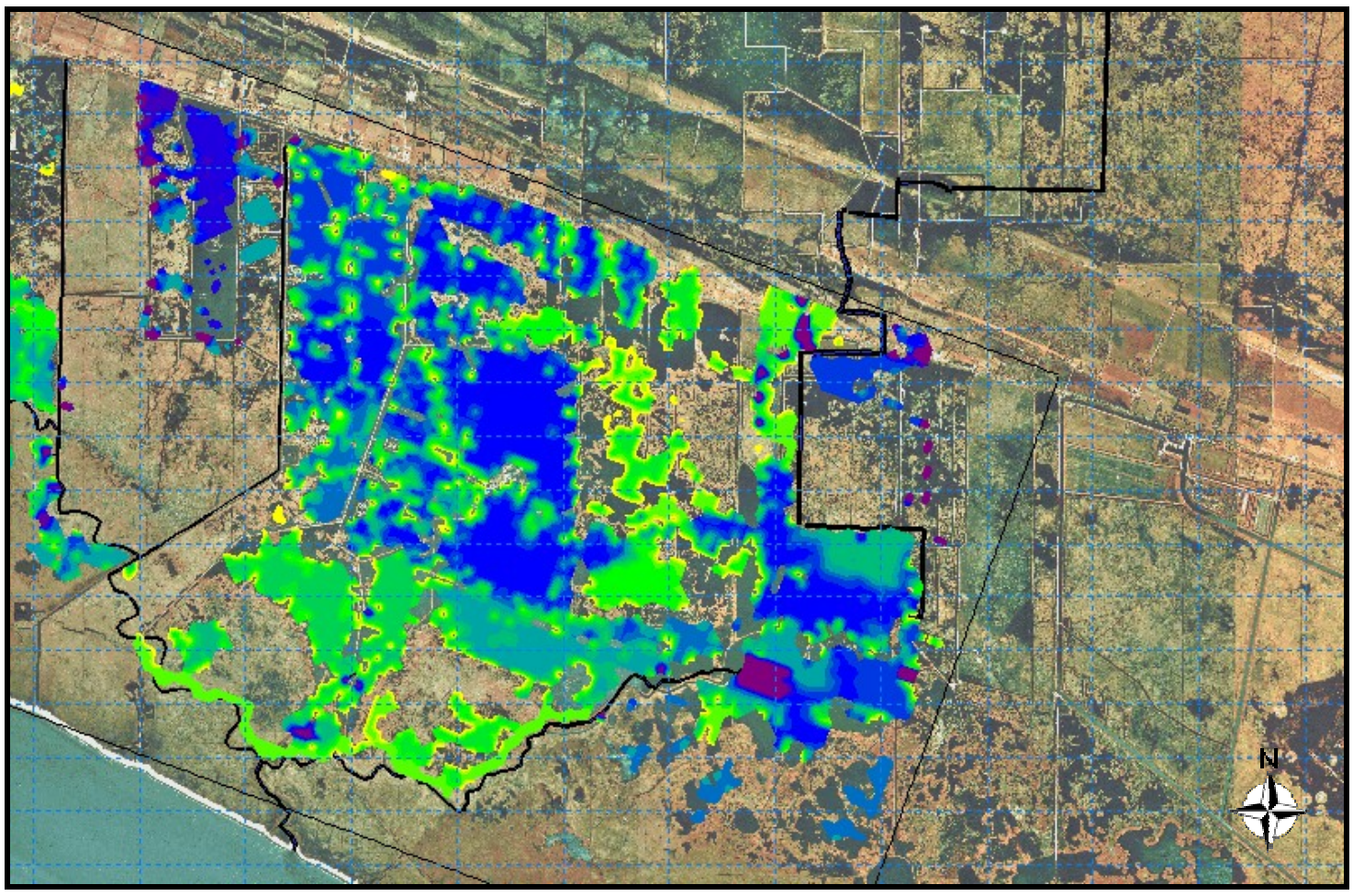


Figure A-78: Month Of January 2003 Average Water Level Change Contour Maps (Alignment No.1 – Existing Conditions)

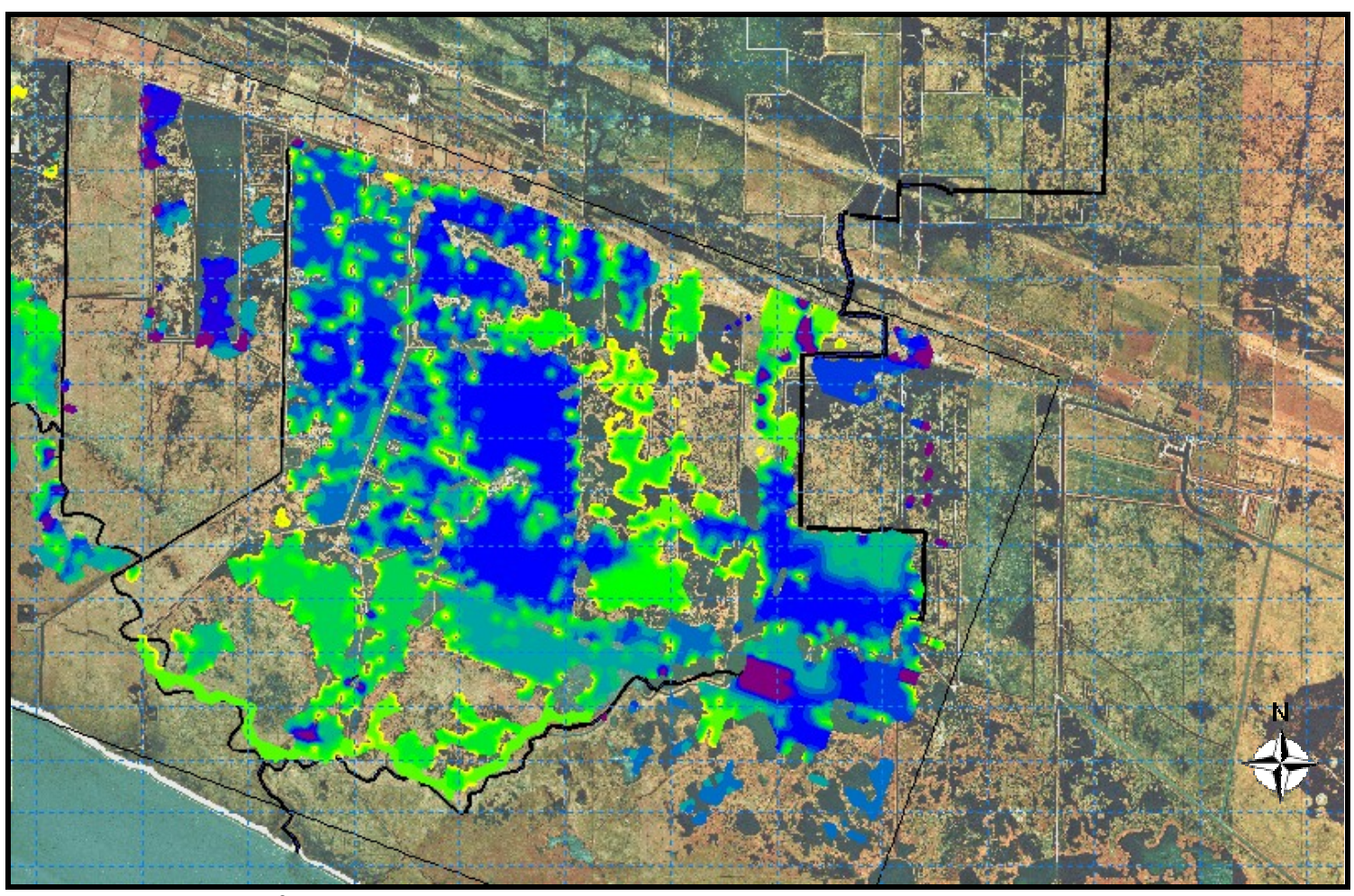
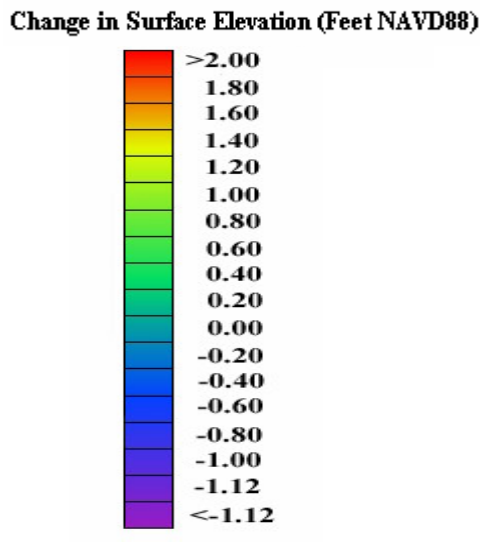


Figure A-79: Month Of January 2003 Average Water Level Change Contour Maps (Alignment No.2 – Existing Conditions)



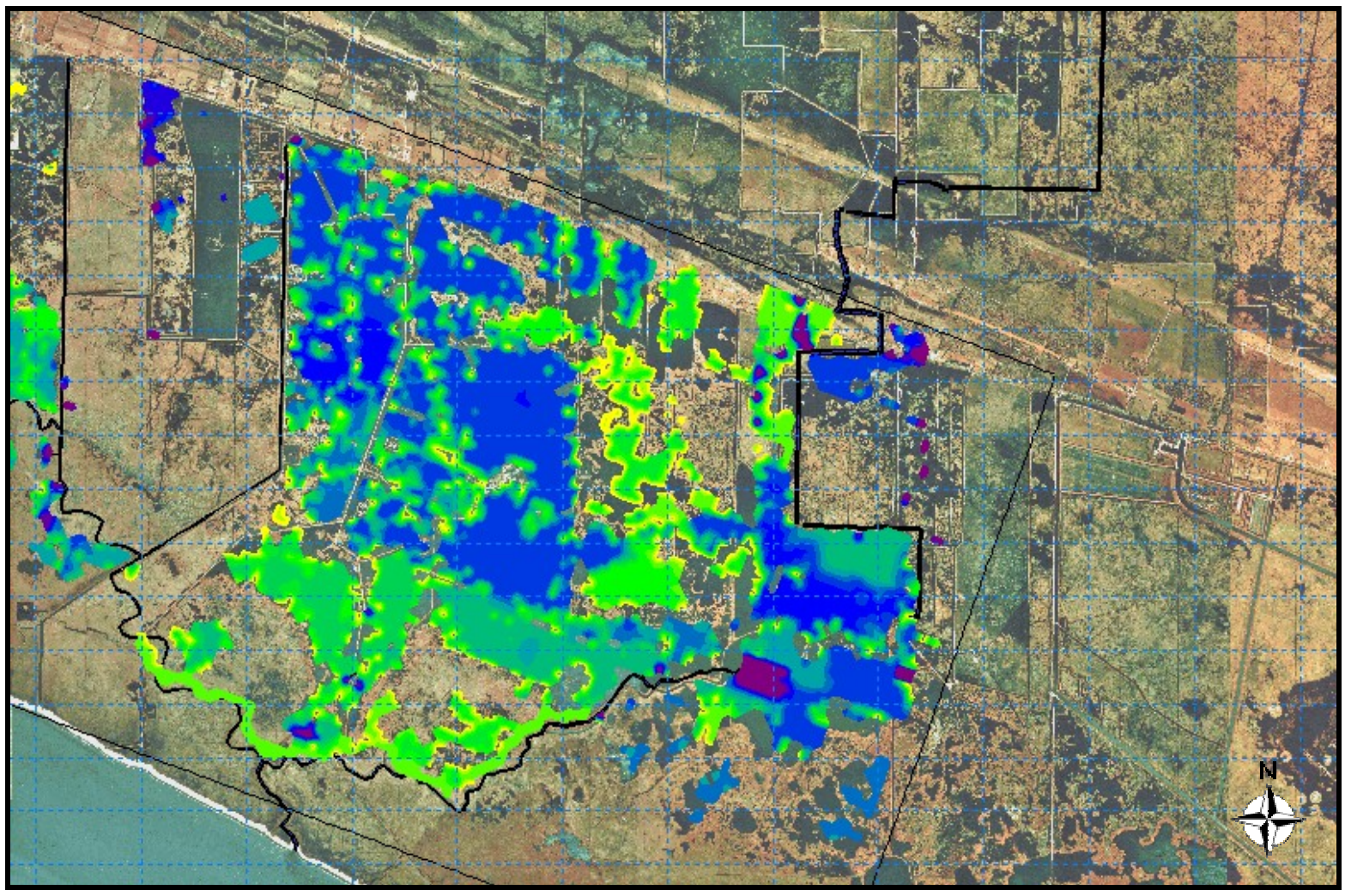


Figure A-80: Month Of February 2003 Average Water Level Change Contour Maps
(Alignment No.1 – Existing Conditions)

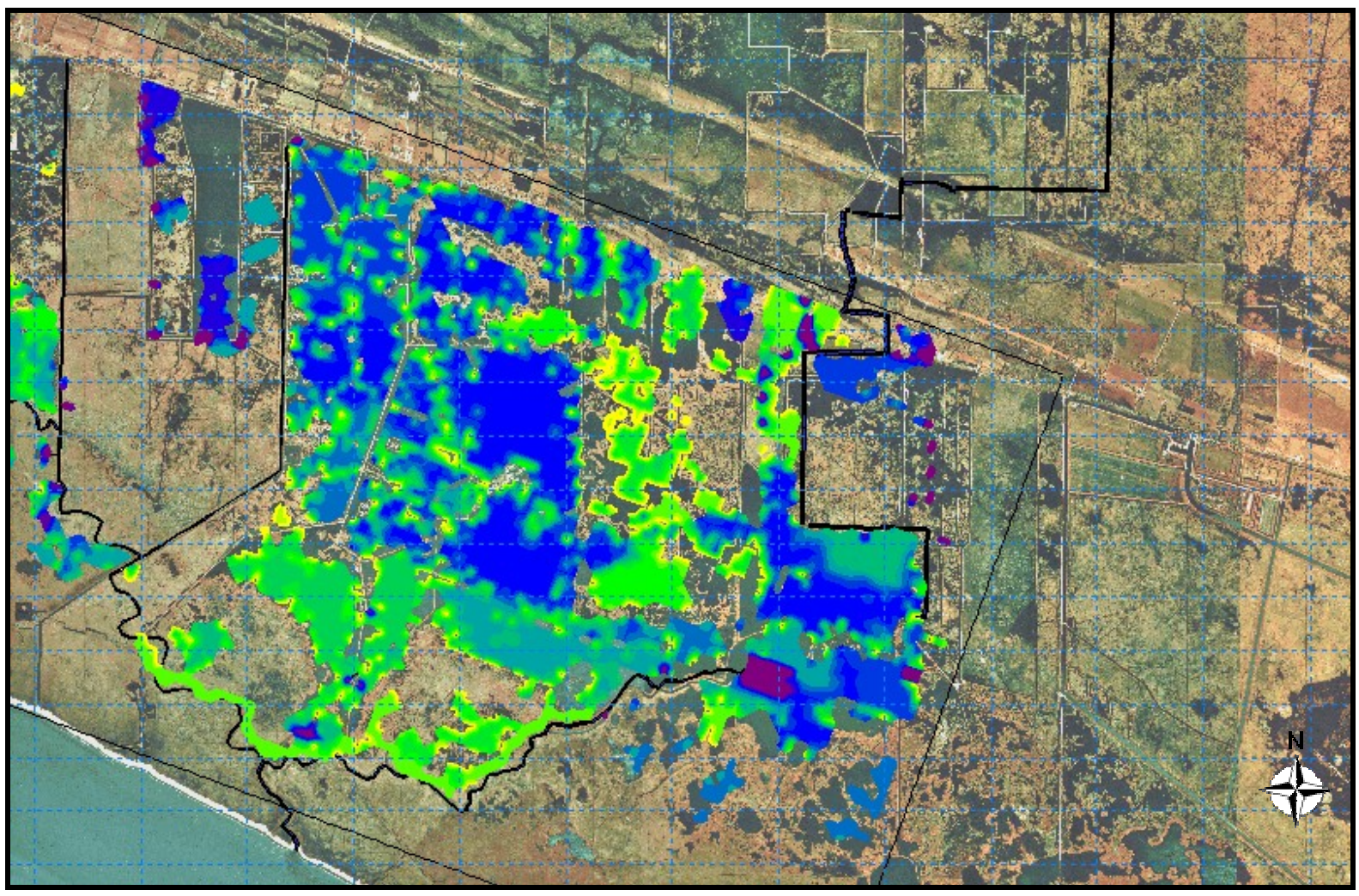
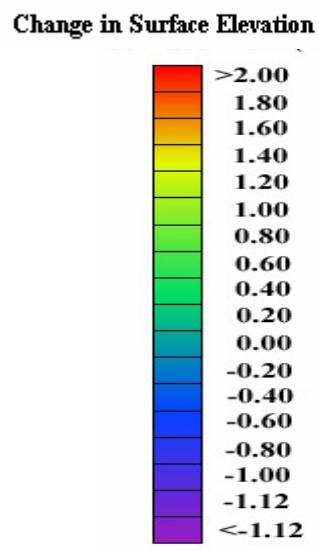


Figure A-81: Month Of February 2003 Average Water Level Change Contour Maps (Alignment No.2 – Existing Conditions)



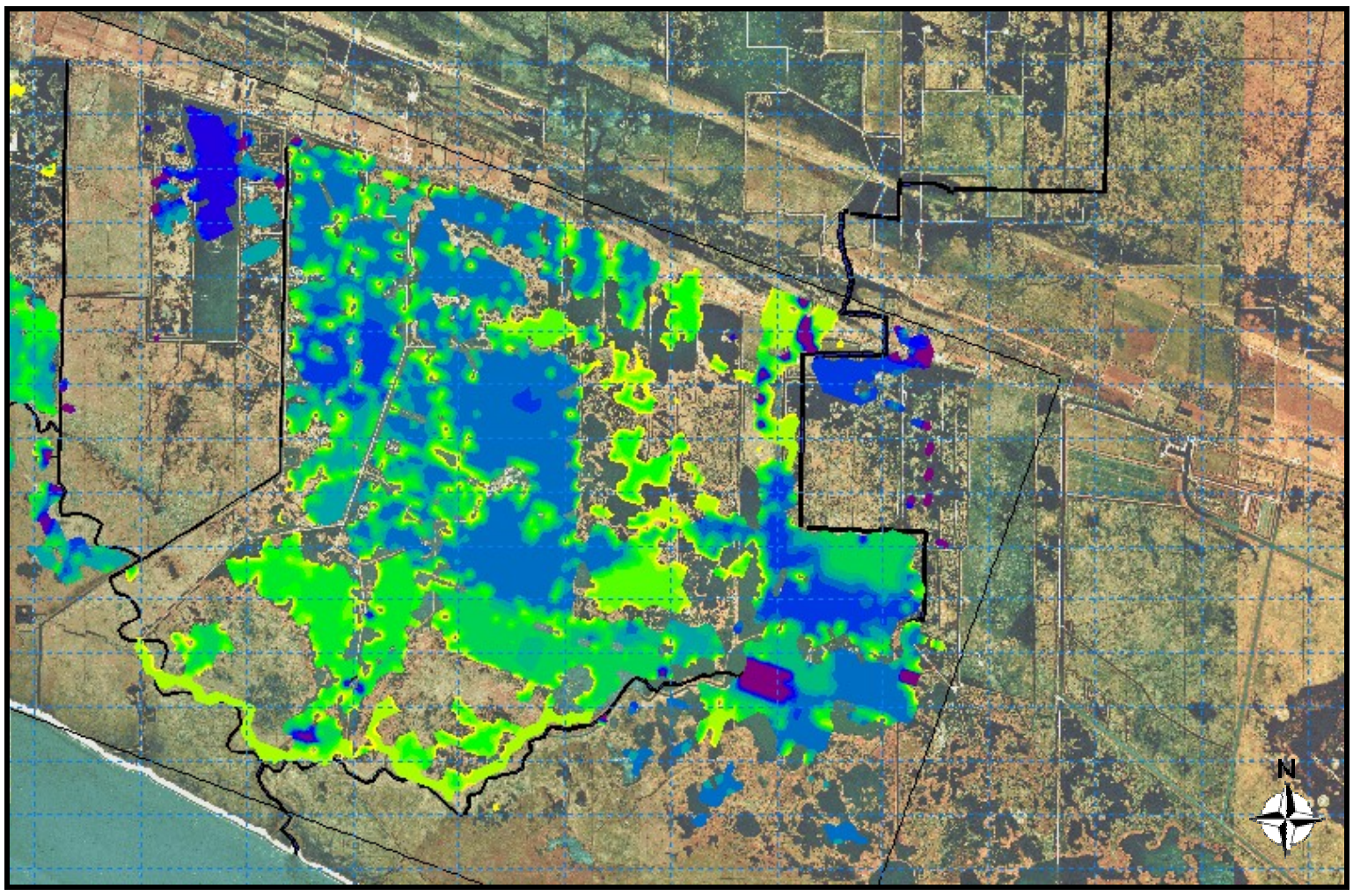


Figure A-82: Month Of March 2003 Average Water Level Change Contour Maps (Alignment No.1 – Existing Conditions)

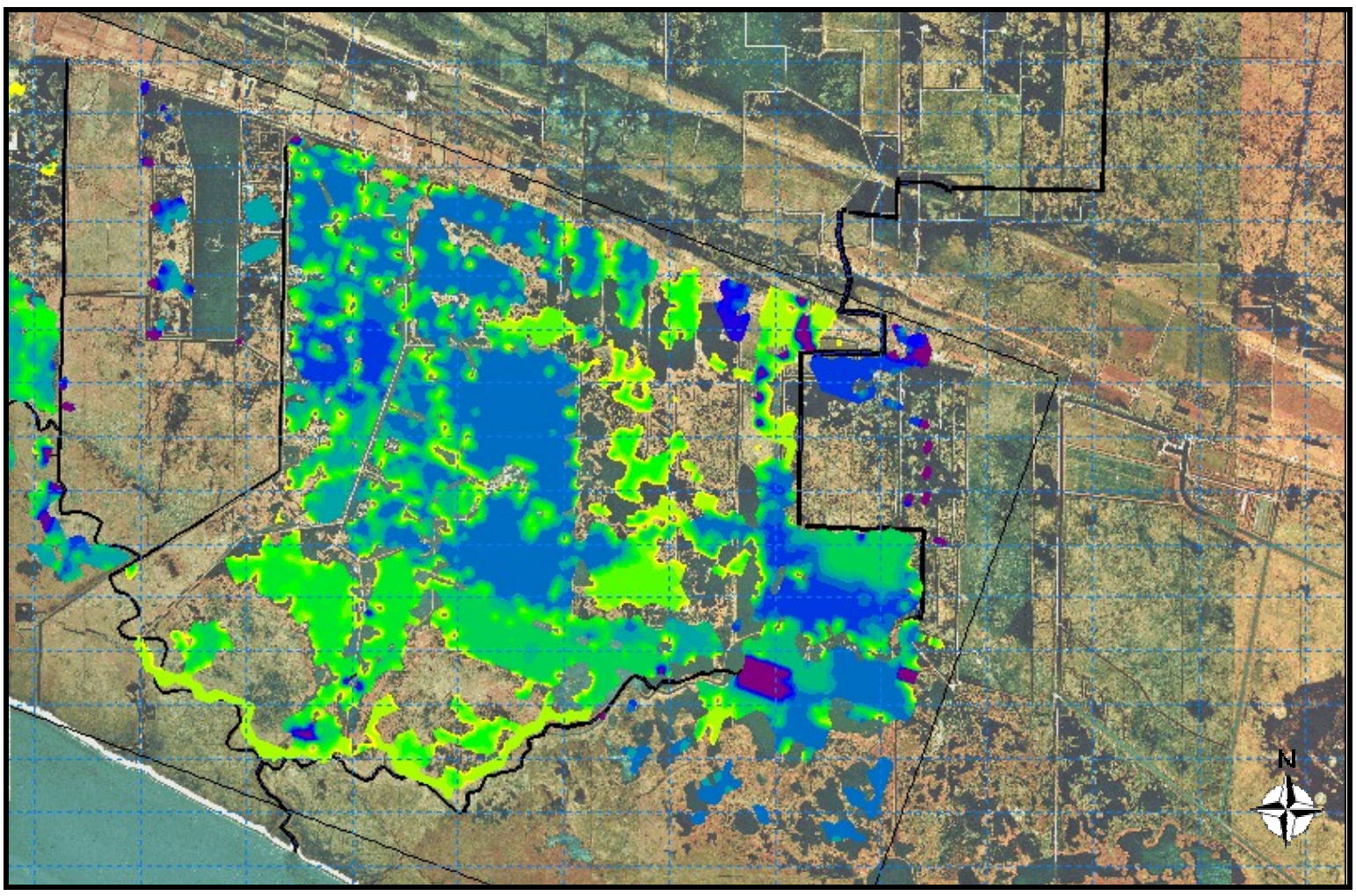
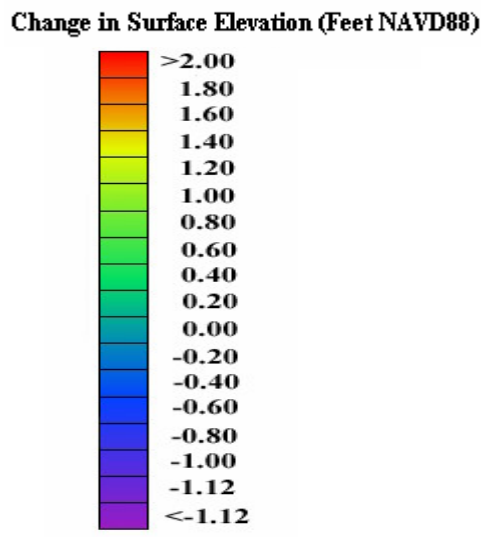
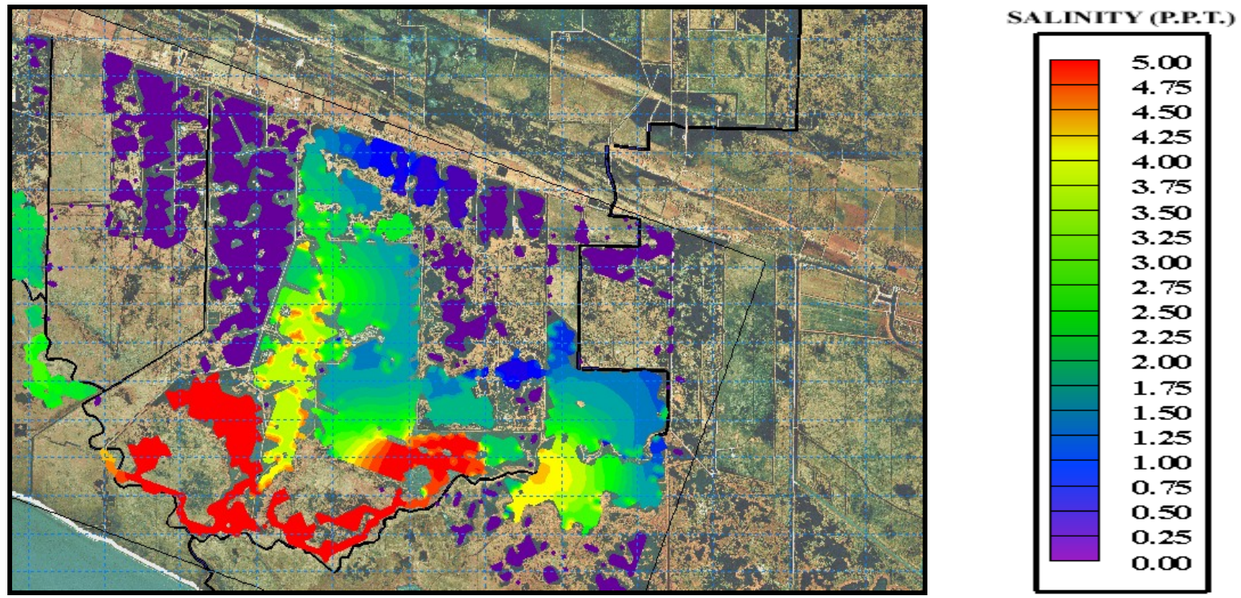
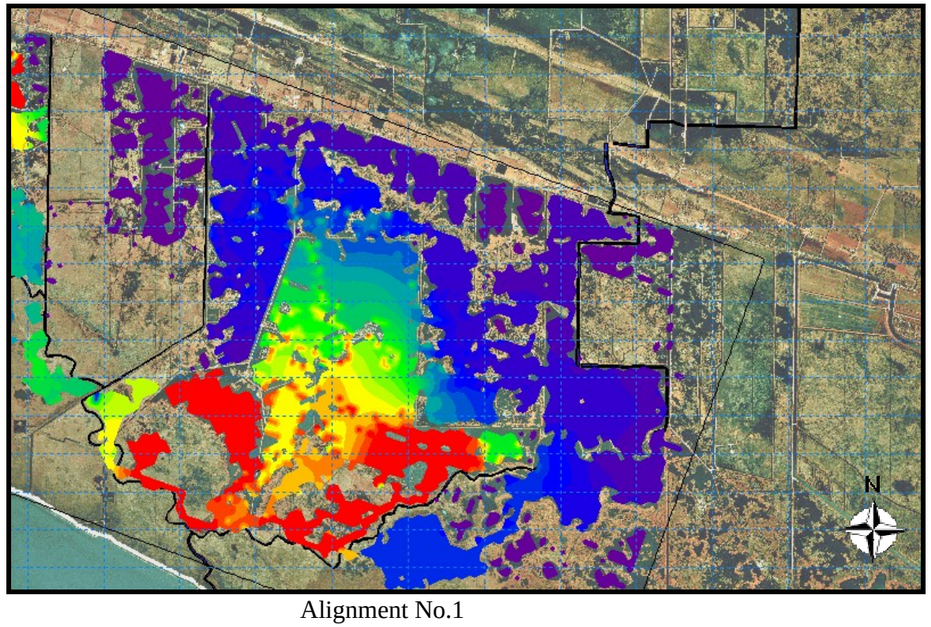


Figure A-83: Month Of March 2003 Average Water Level Change Contour Maps (Alignment No.2 – Existing Conditions)

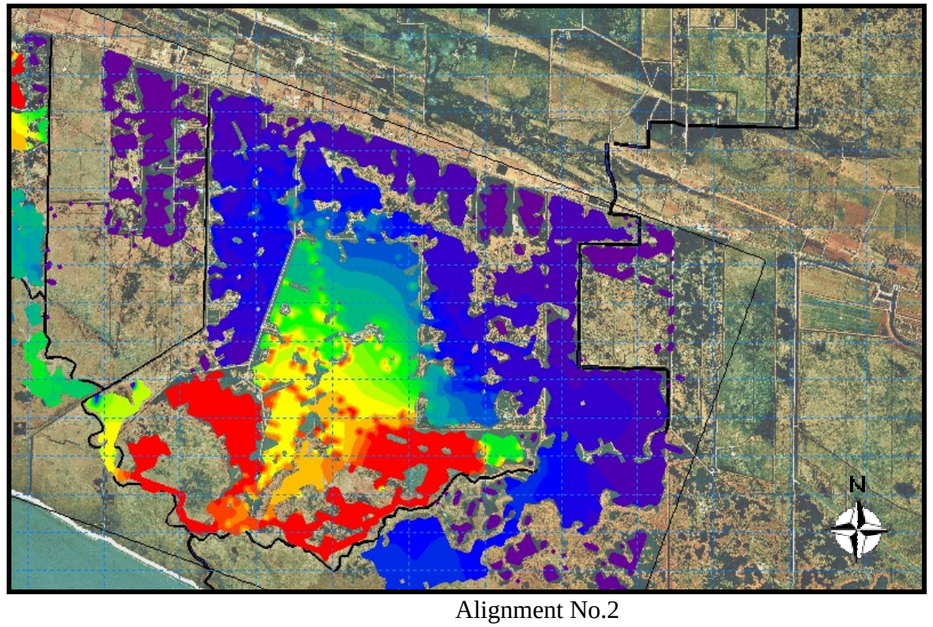




Existing Conditions

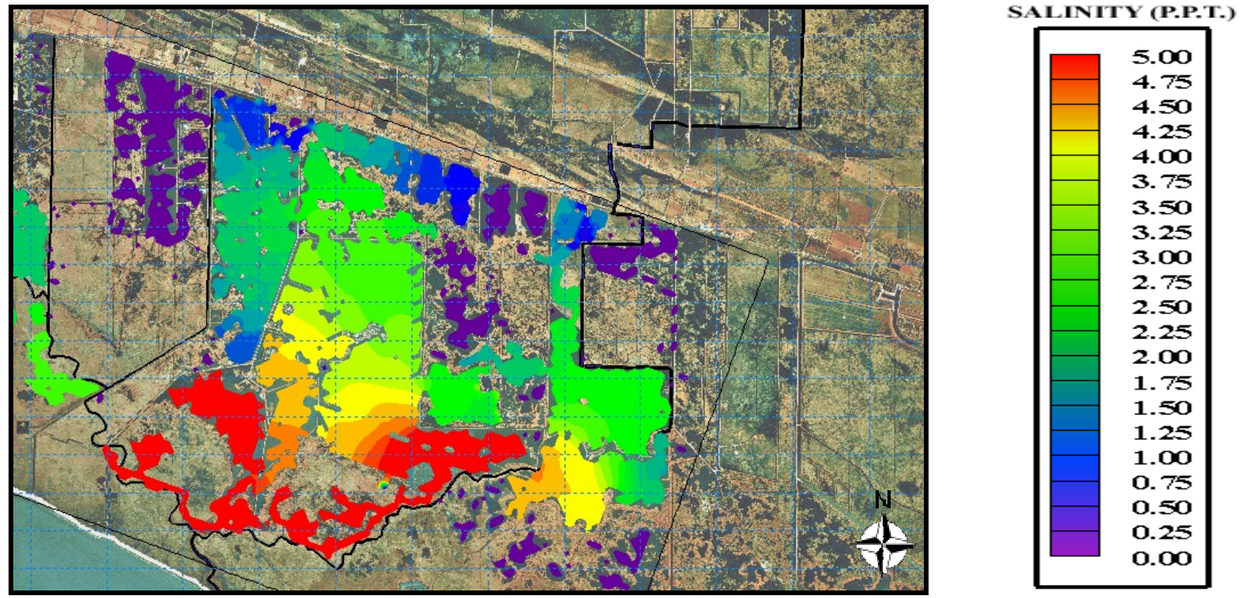


Alignment No.1

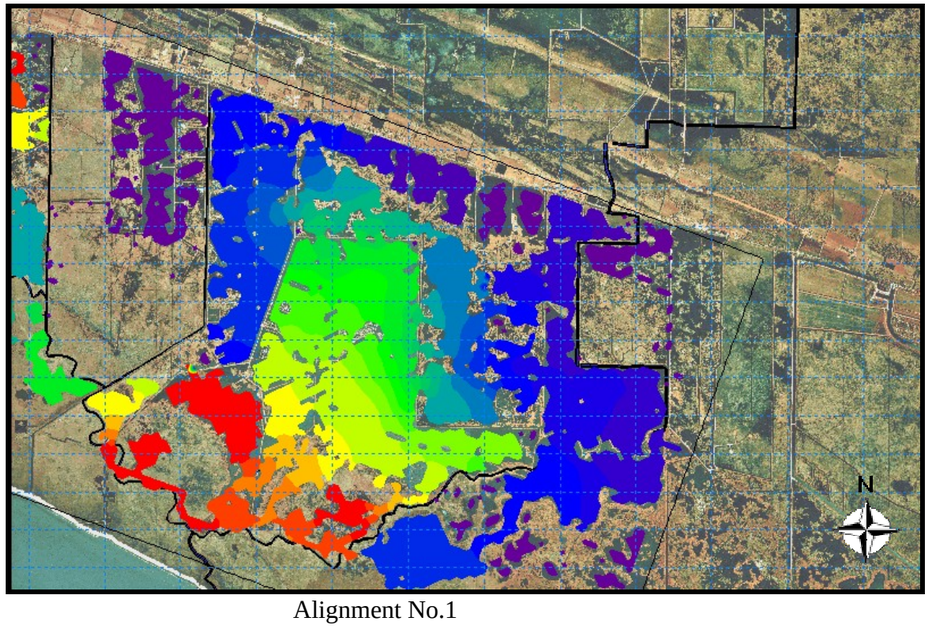


Alignment No.2

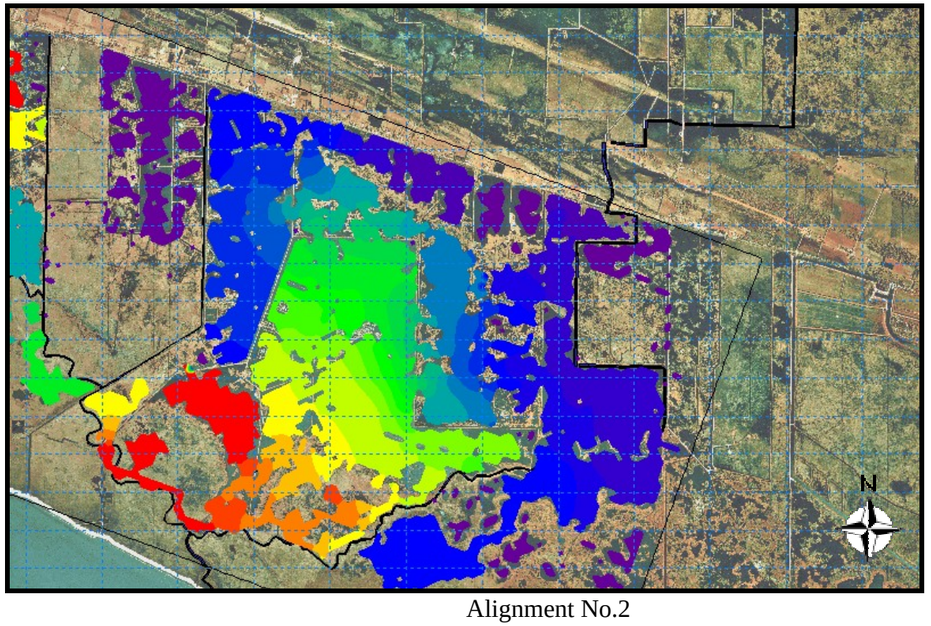
Figure A-84: Month Of November 2002 Average Salinity Contour Maps



Existing Conditions

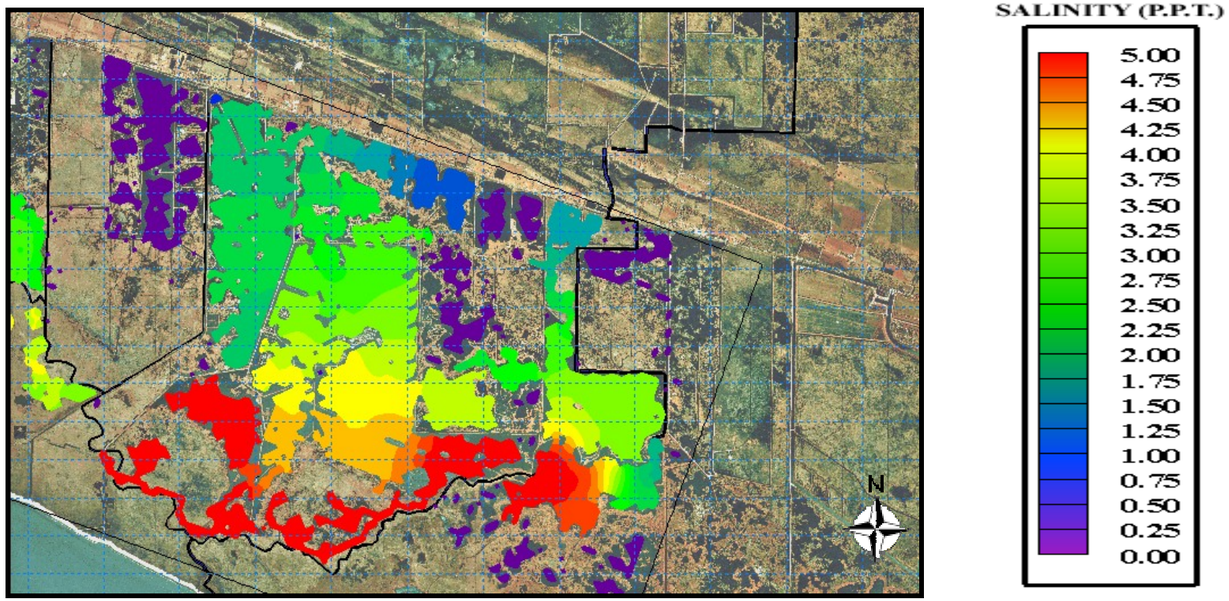


Alignment No.1

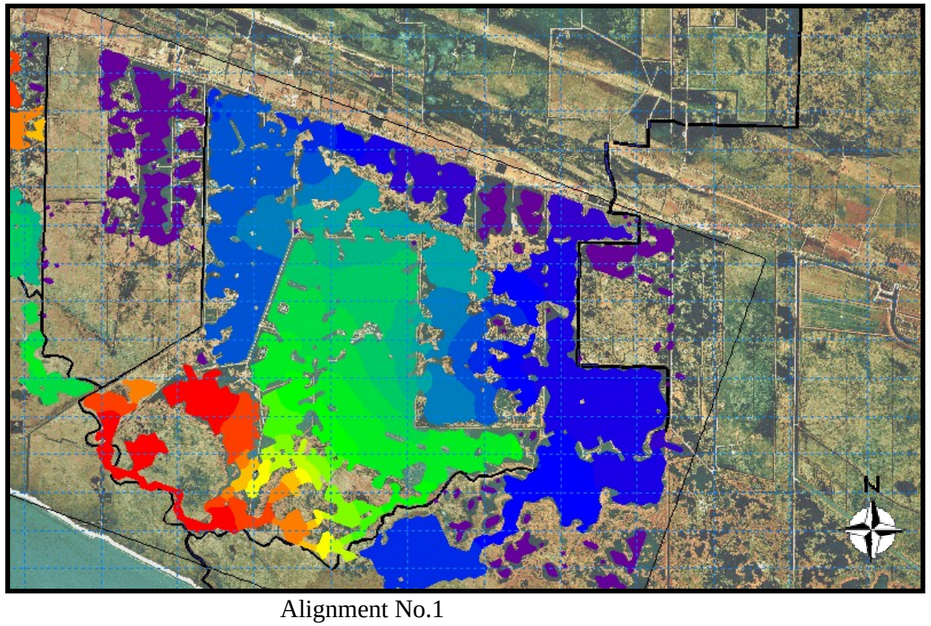


Alignment No.2

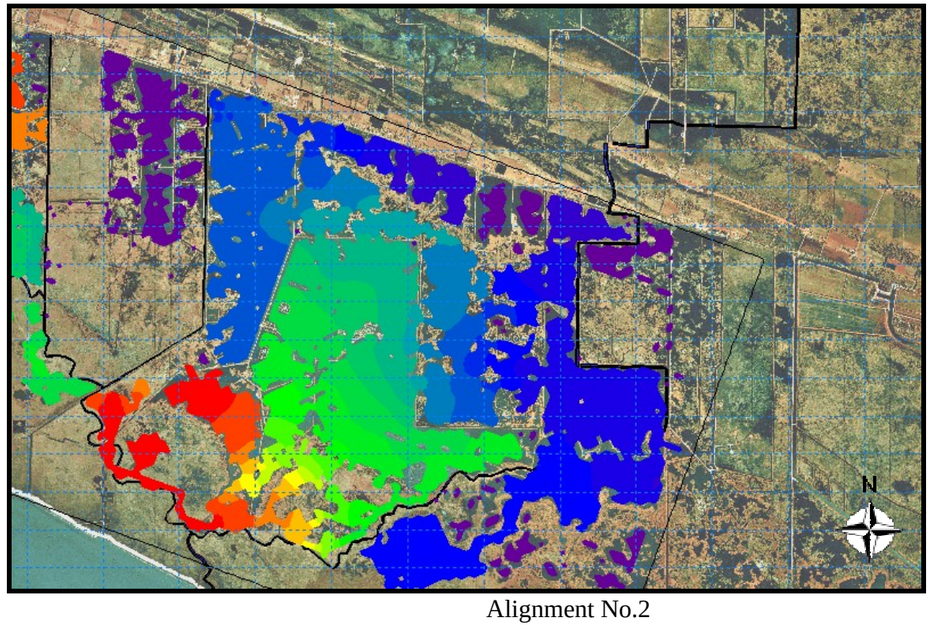
Figure A-85: Month Of December 2002 Average Salinity Contour Maps



Existing Conditions

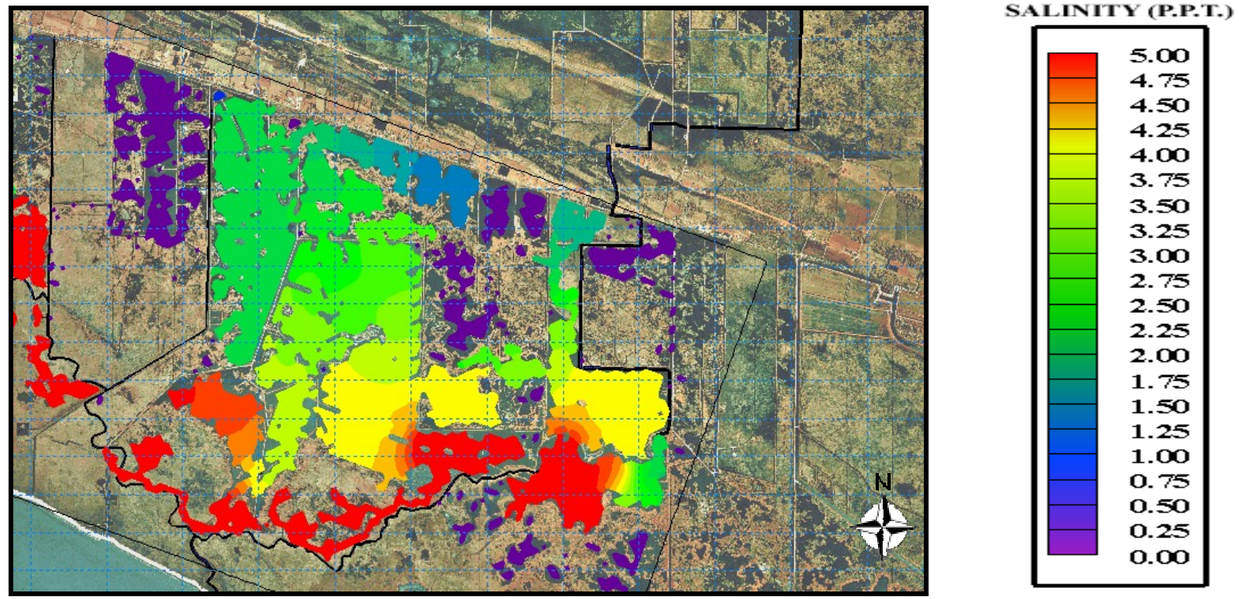


Alignment No.1

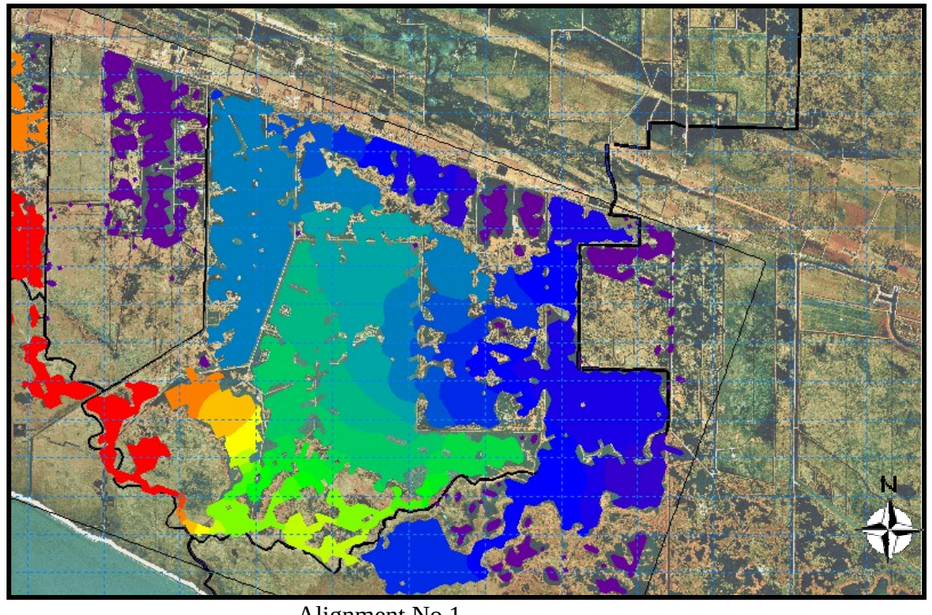


Alignment No.2

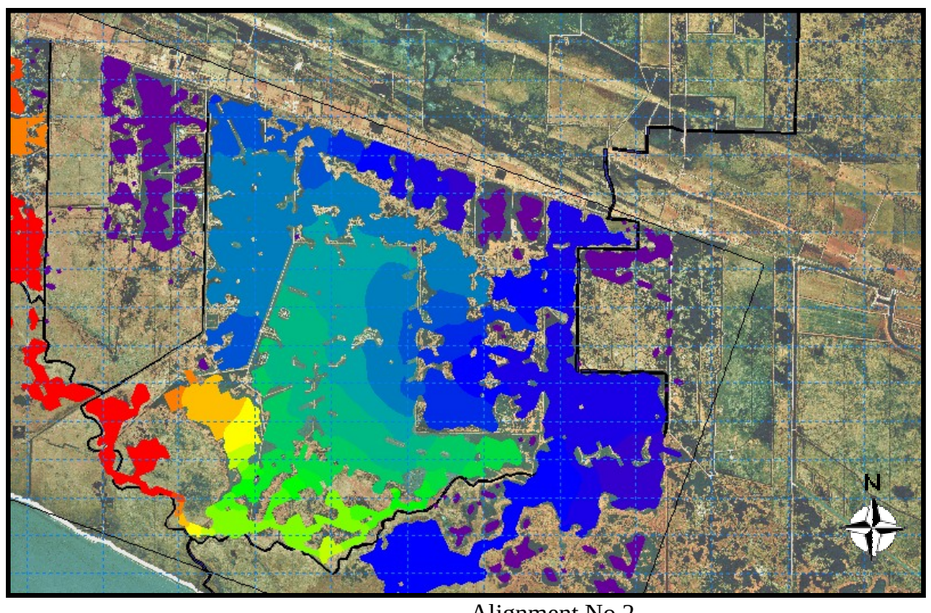
Figure A-86: Month Of January 2003 Average Salinity Contour Maps



Existing Conditions

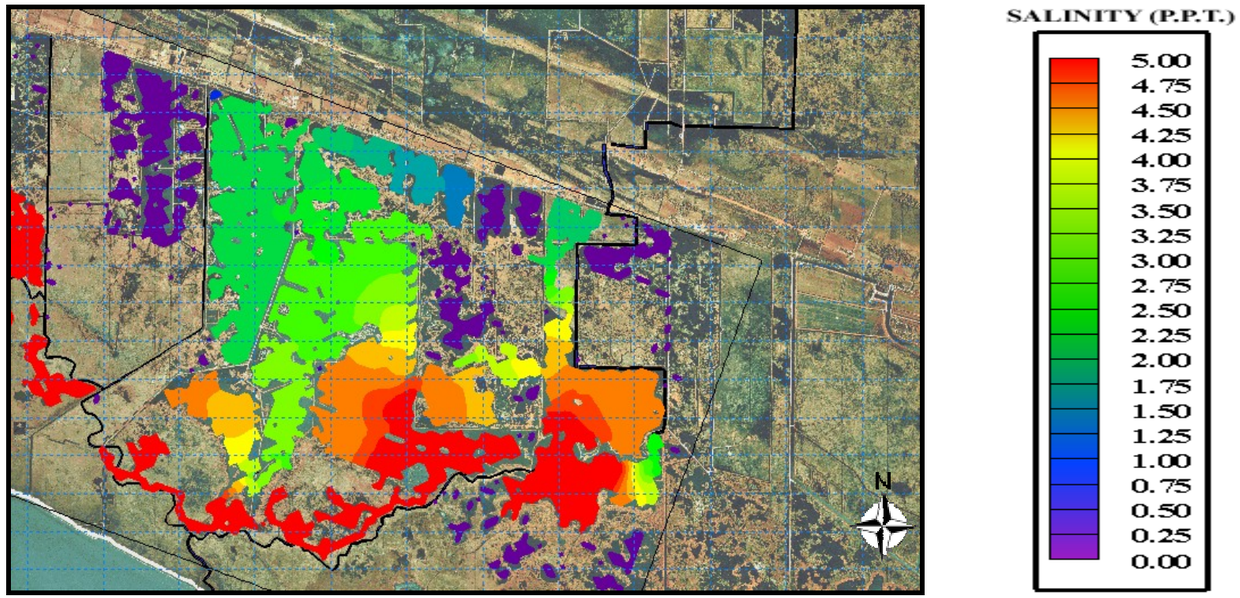


Alignment No.1

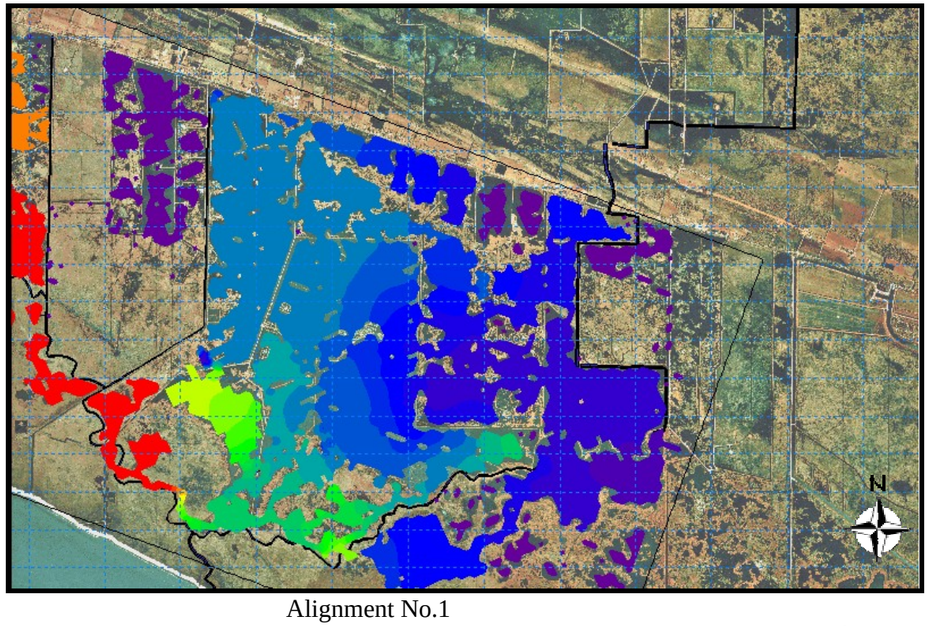


Alignment No.2

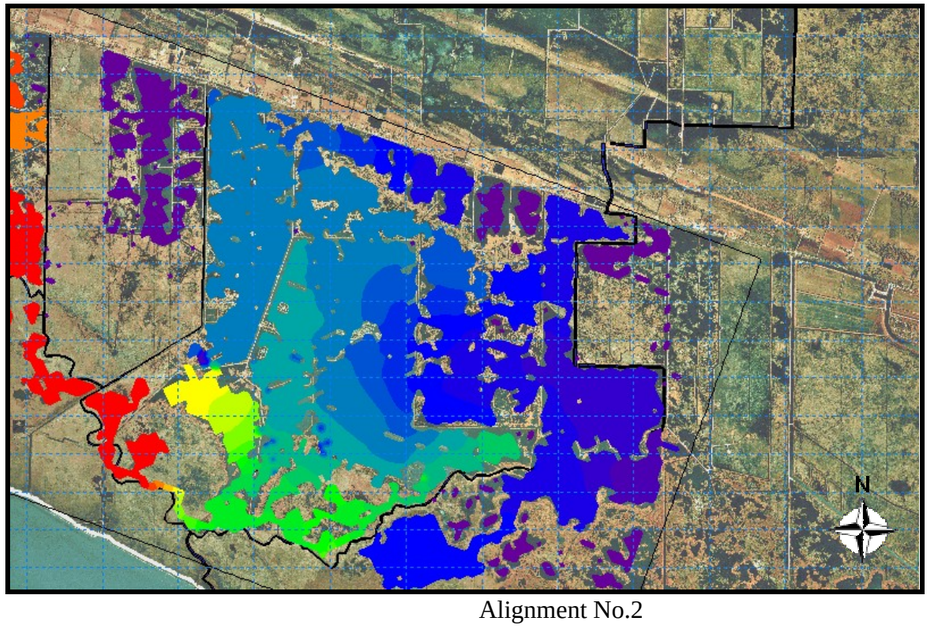
Figure A-87: Month Of February 2003 Average Salinity Contour Maps



Existing Conditions



Alignment No.1



Alignment No.2

Figure A-88: Month Of March 2003 Average Salinity Contour Maps

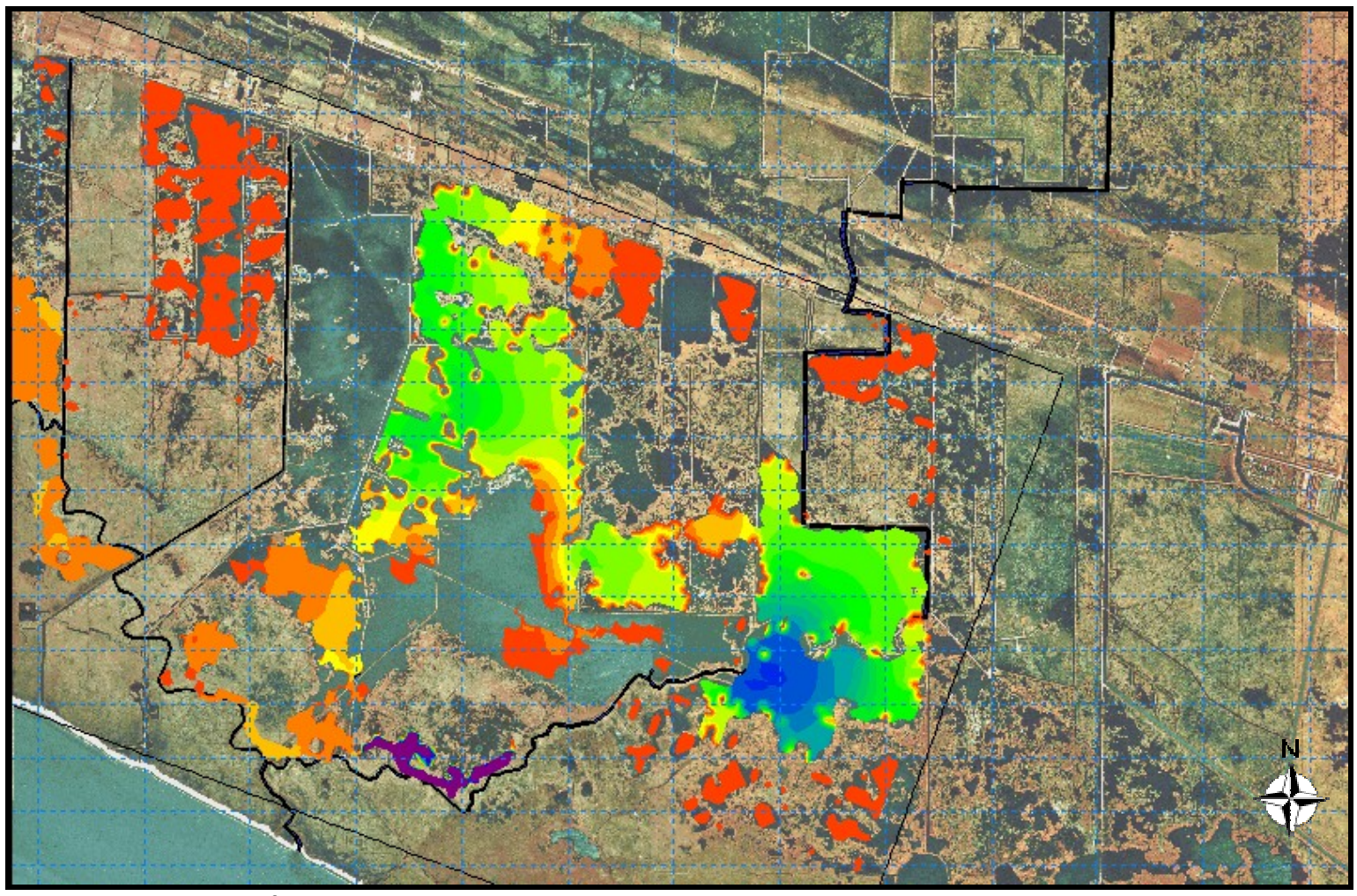


Figure A-89: Month Of November 2002 Average Salinity Change Contour Maps (Alignment No.1 – Existing Conditions)

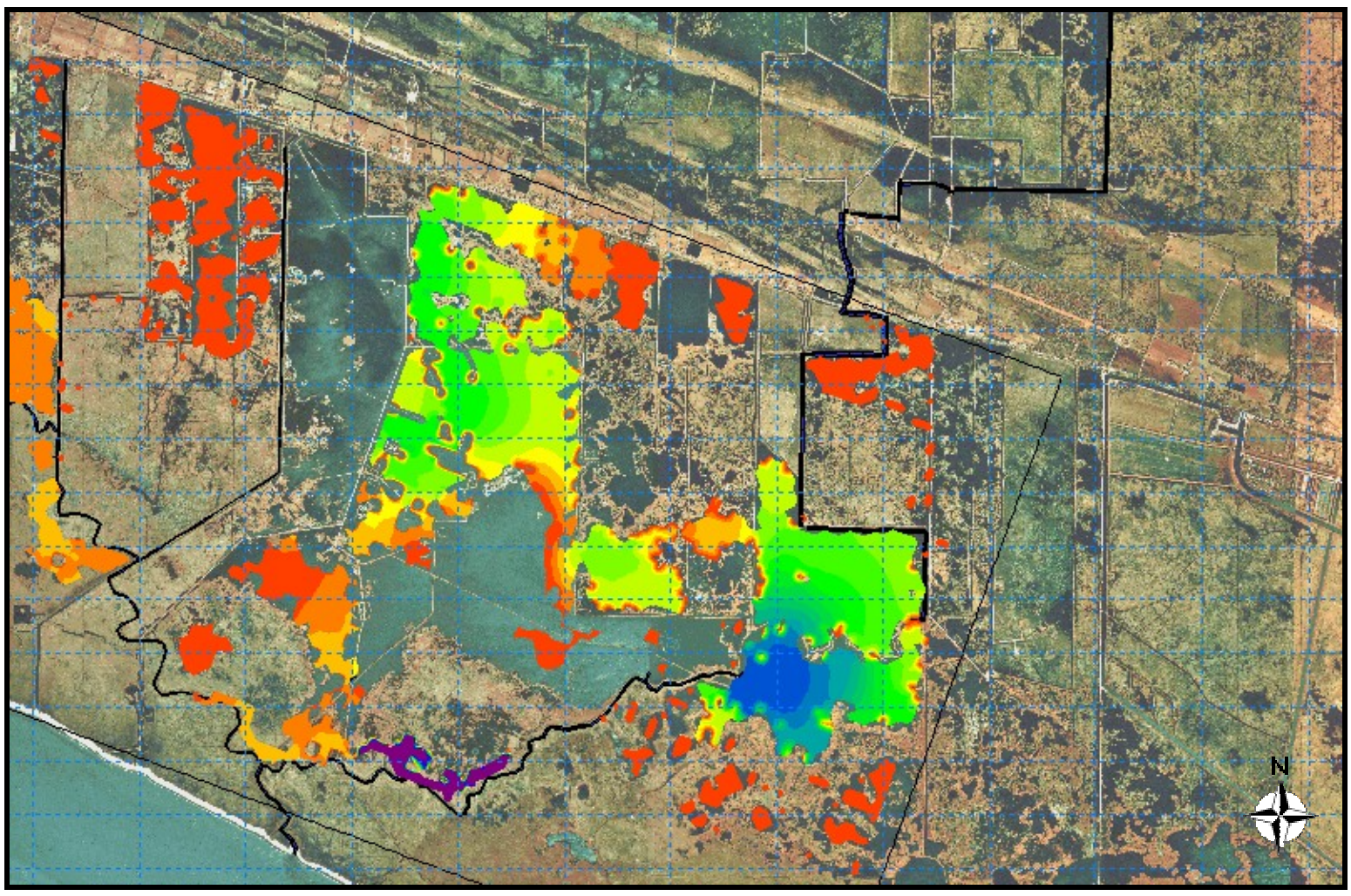
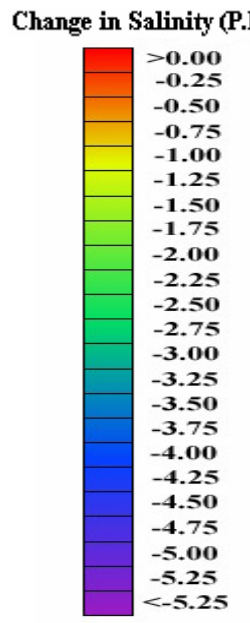


Figure A-90: Month Of November 2002 Average Salinity Change Contour Maps (Alignment No.2 – Existing Conditions)



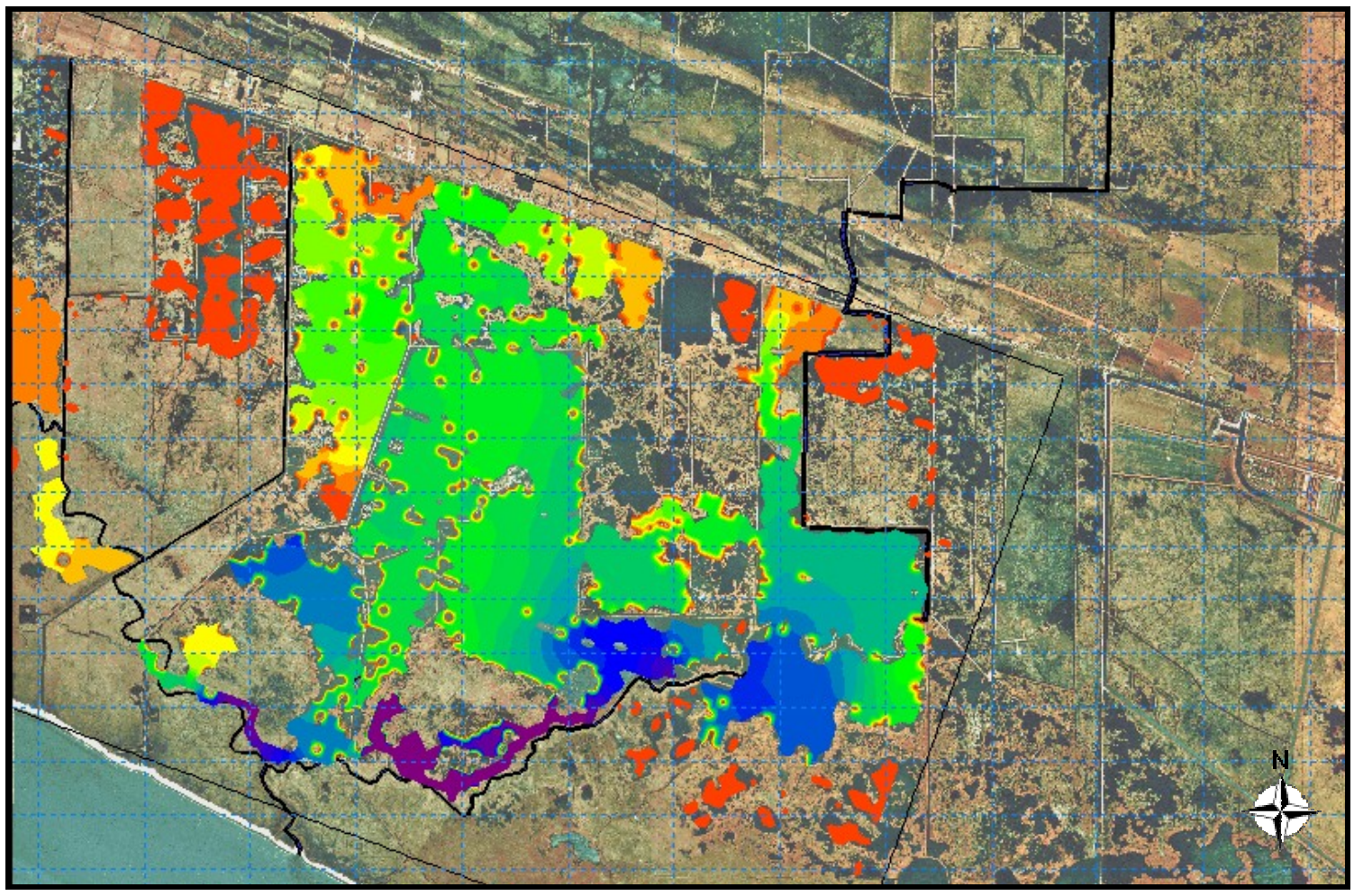


Figure A-91: Month Of December 2002 Average Salinity Change Contour Maps (Alignment No.1 – Existing Conditions)

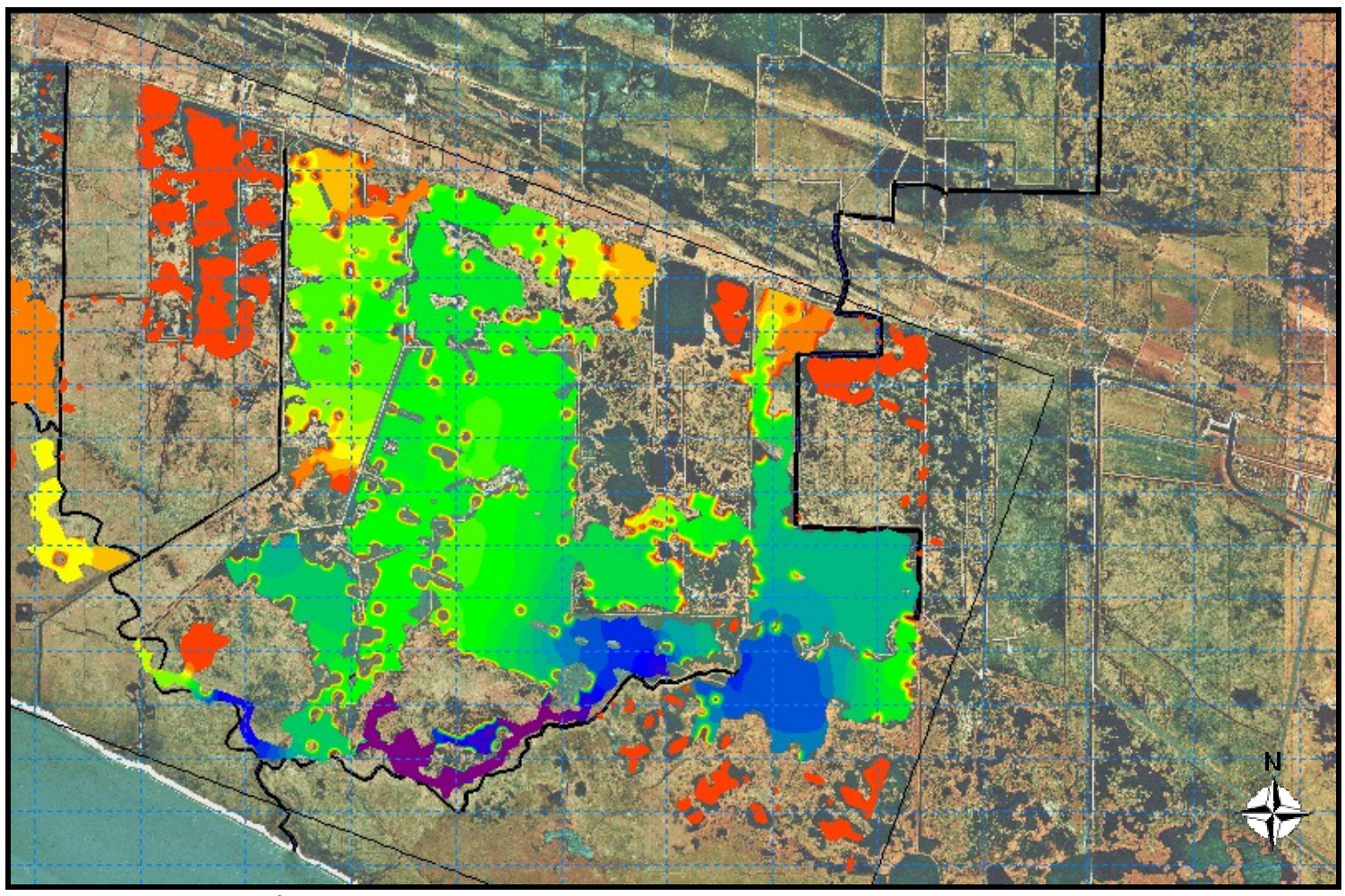
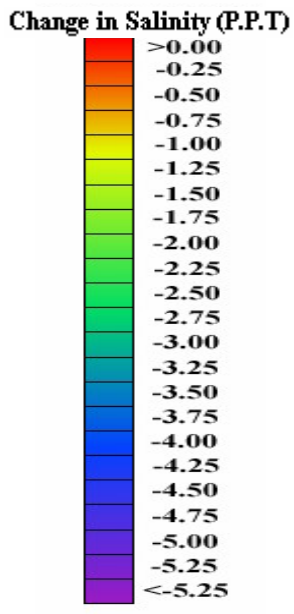


Figure A-92: Month Of December 2002 Average Salinity Change Contour Maps (Alignment No.2 – Existing Conditions)



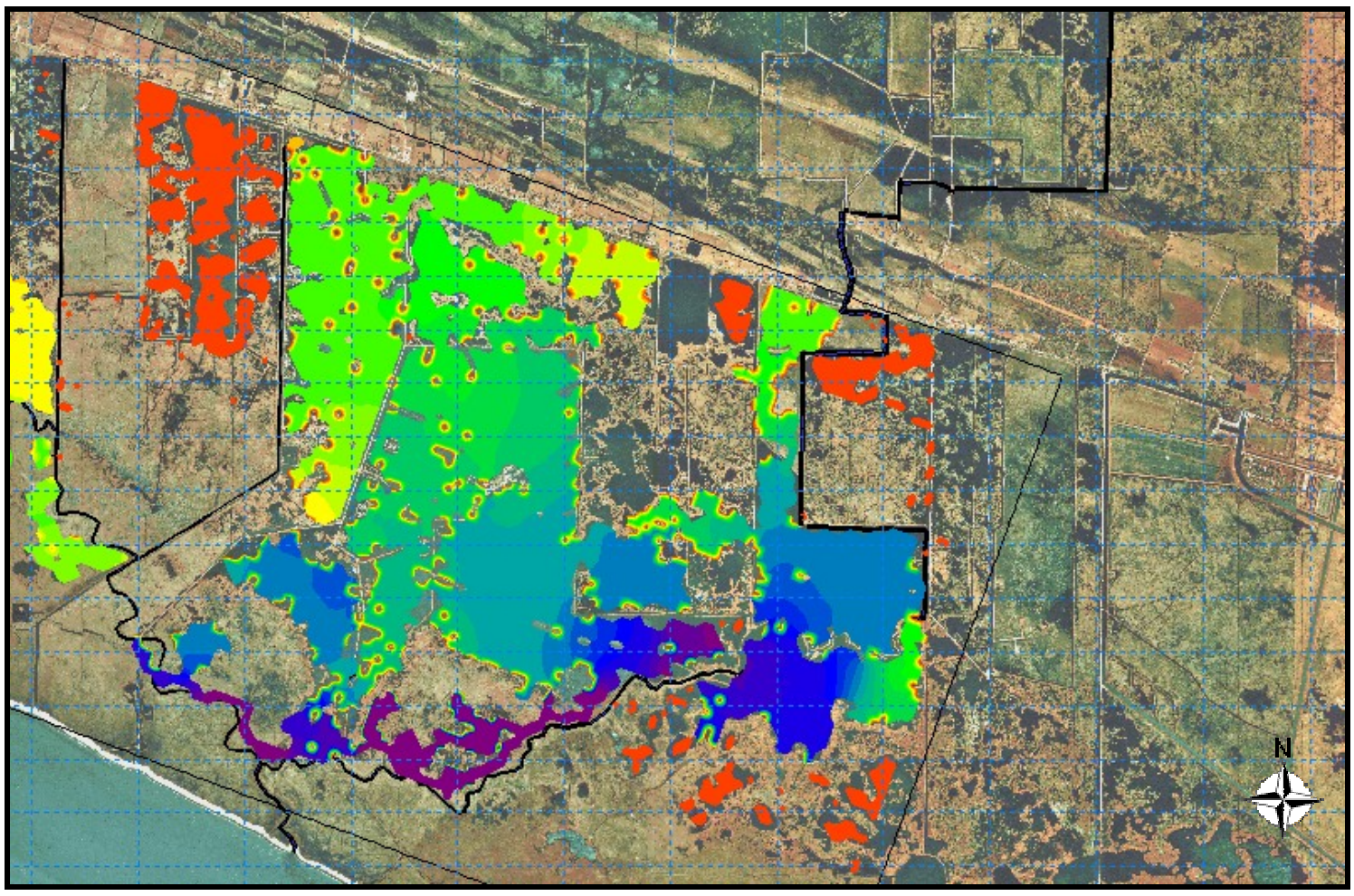


Figure A-93: Month Of January 2003 Average Salinity Change Contour Maps (Alignment No.1 – Existing Conditions)

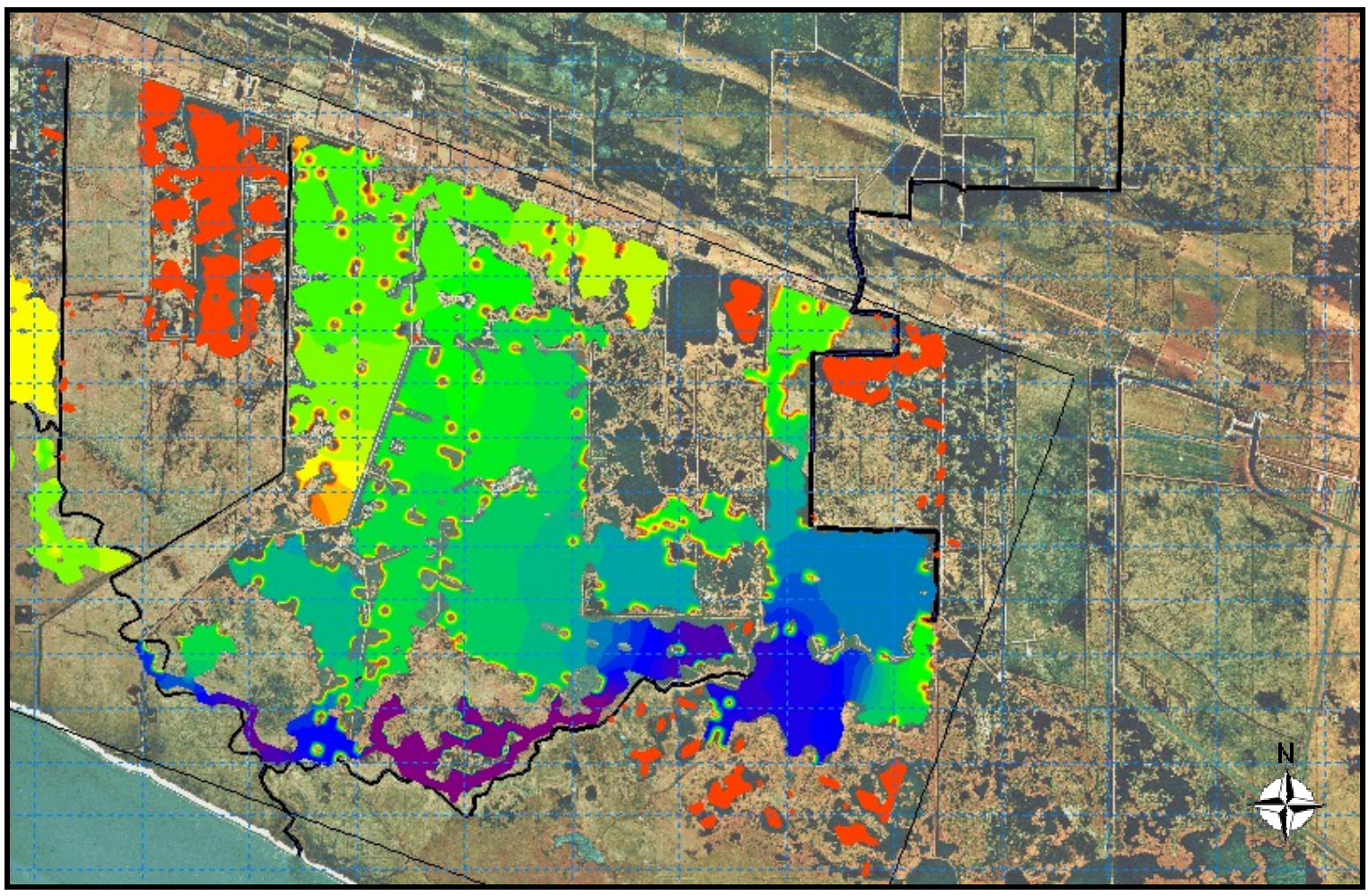
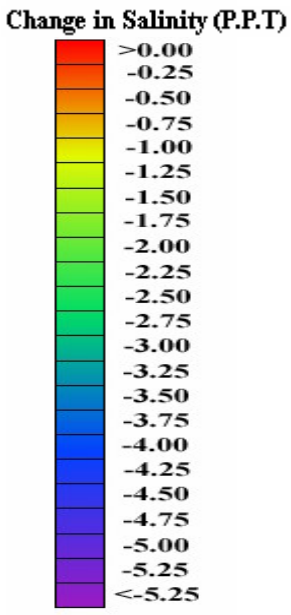


Figure A-94: Month Of January 2003 Average Salinity Change Contour Maps (Alignment No.2 – Existing Conditions)



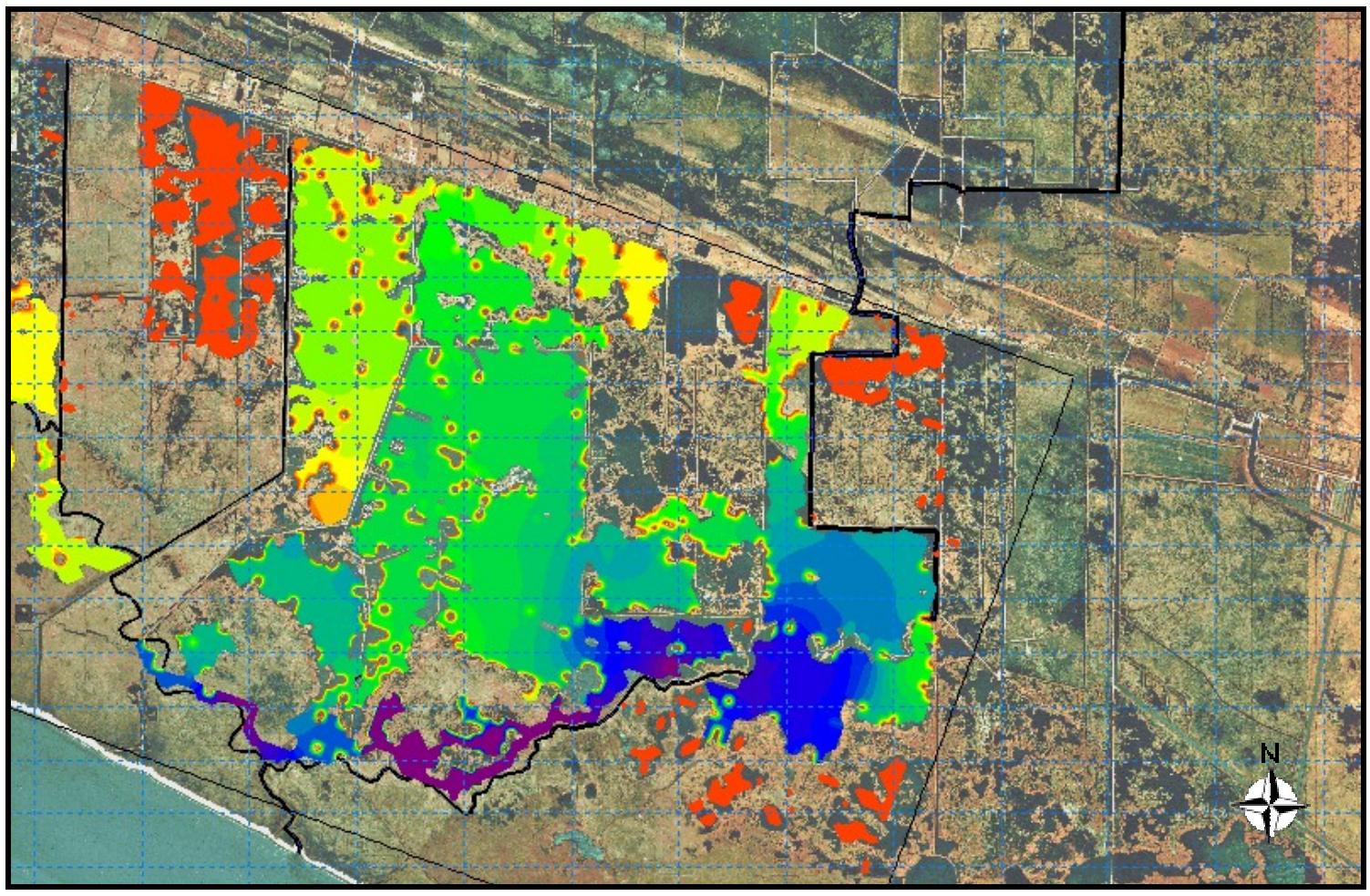


Figure A-95: Month Of February 2003 Average Salinity Change Contour Maps (Alignment No.1 – Existing Conditions)

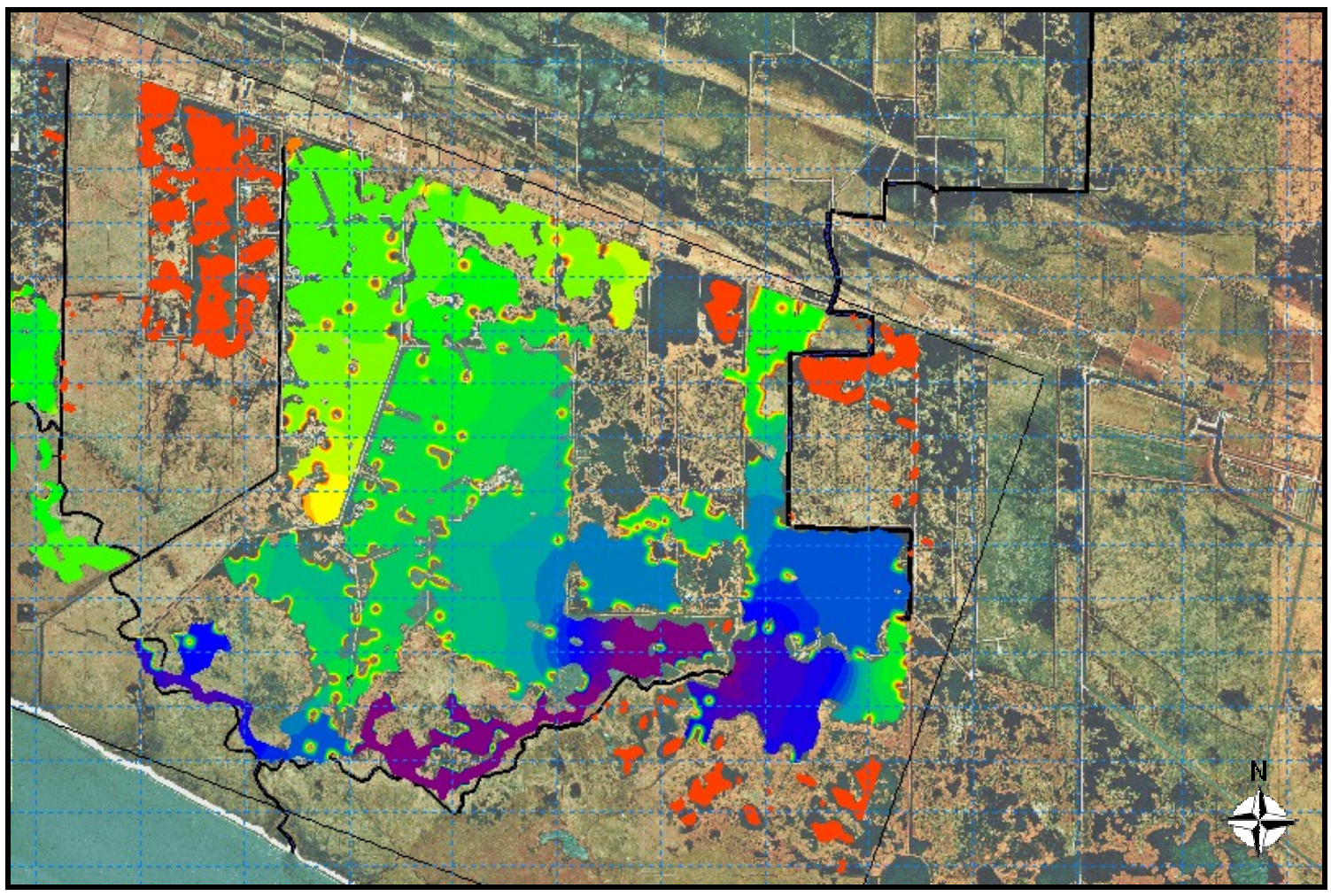
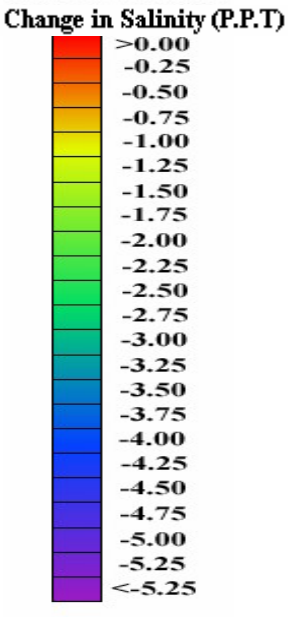


Figure A-96: Month Of February 2003 Average Salinity Change Contour Maps (Alignment No.2 – Existing Conditions)



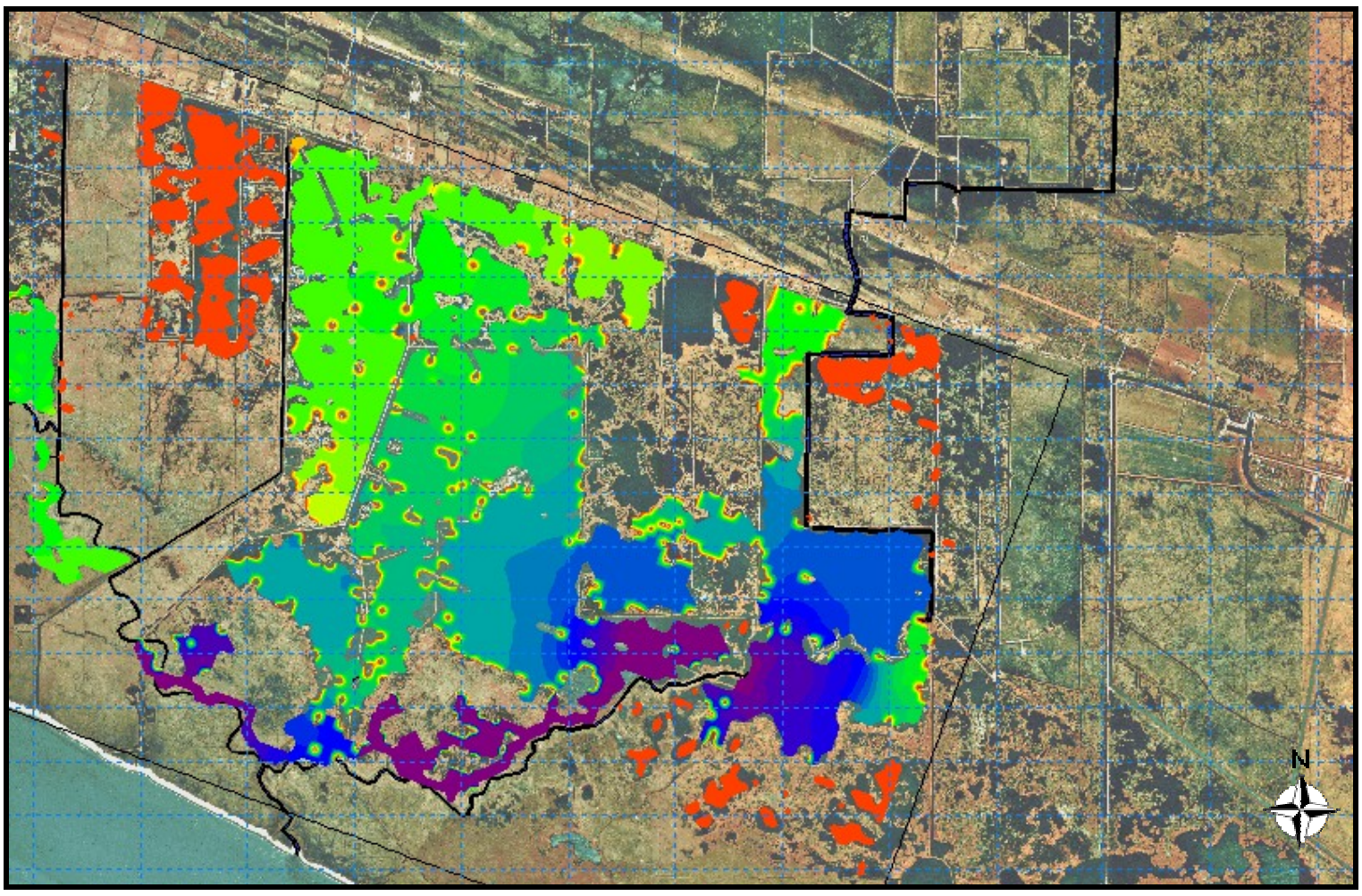


Figure A-97: Month Of March 2003 Average Salinity Change Contour Maps (Alignment No.1 – Existing Conditions)

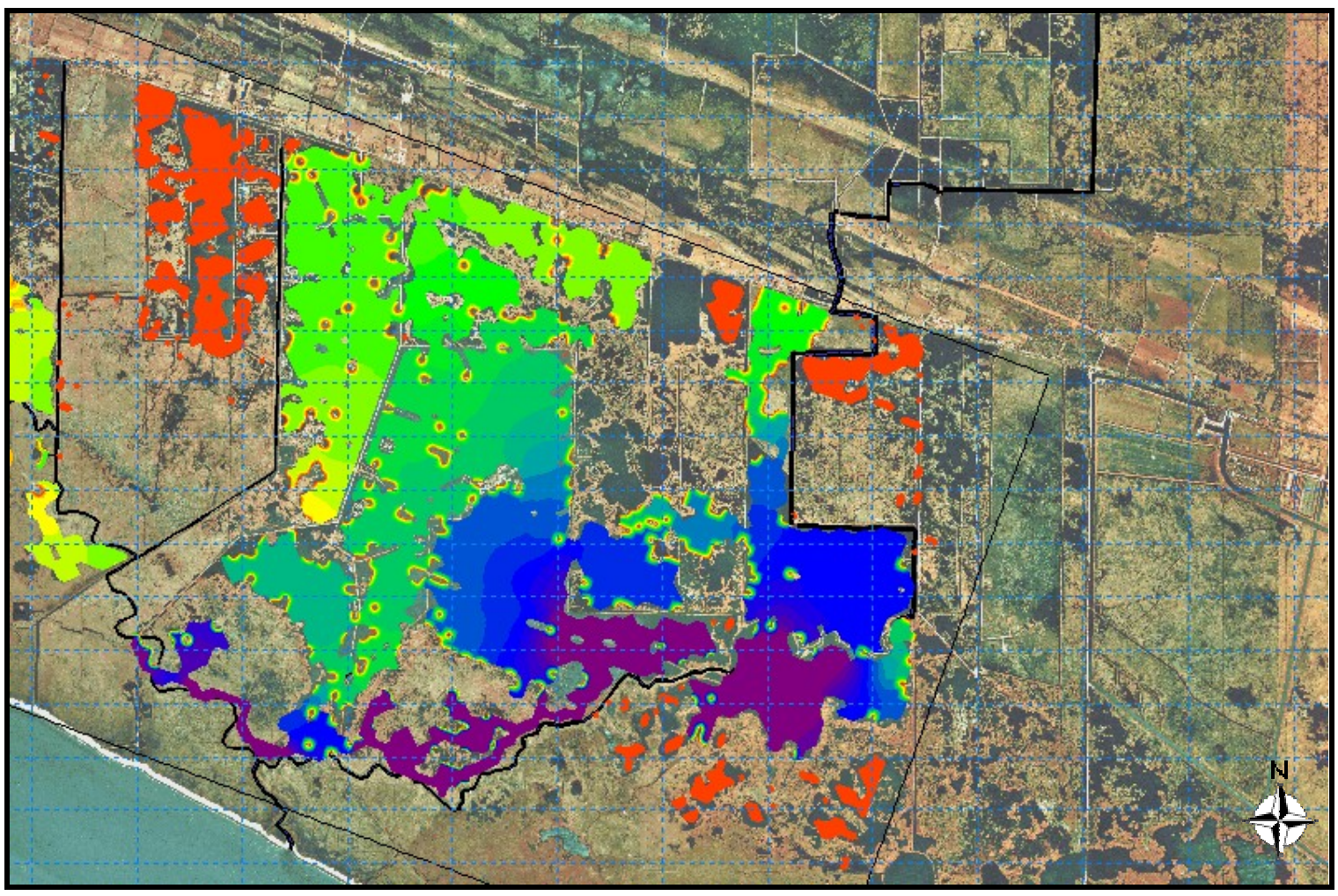
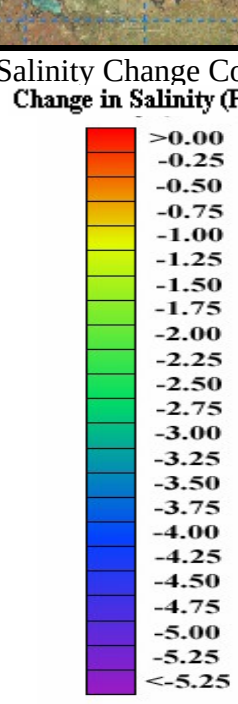


Figure A-98: Month Of March 2003 Average Salinity Change Contour Maps (Alignment No.2 – Existing Conditions)



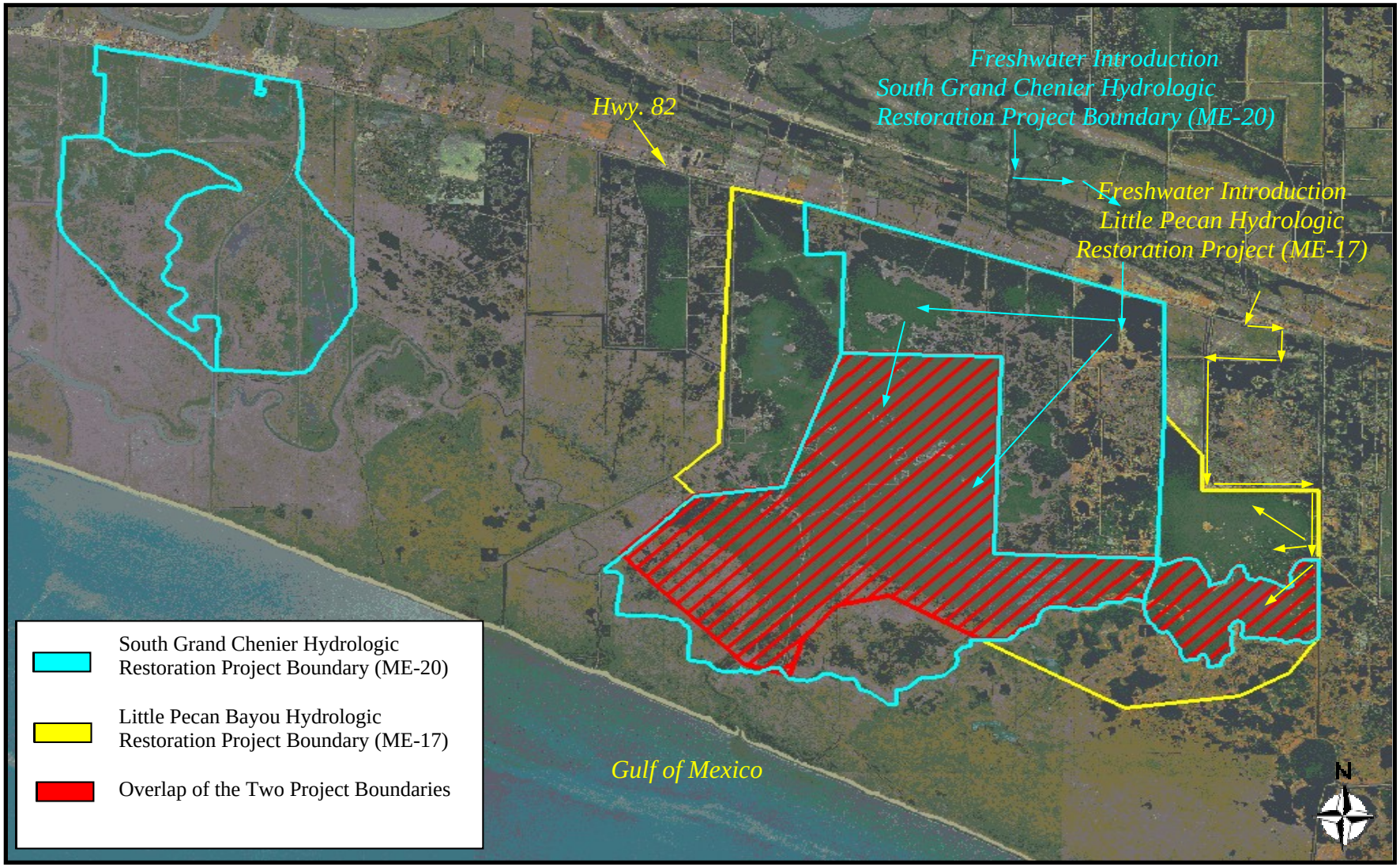


Figure A-99: Overlap of Project Boundaries for both the South Grand Chenier Hydrologic Restoration Project (ME-20) and the Little Pecan Bayou Hydrologic Restoration Project (ME-17)